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NOVEL POLYPEPTIDES AND NUCLEIC ACIDS ENCODING SAME

RELATED APPLICATIONS

This application claims priority to USSN 60/171,746, filed December 22, 1999, which is incorporated herein by reference.

BACKGROUND OF THE INVENTION

Mammals are able to discriminate between thousands of odor molecules. This capacity relies on a multigene family encoding 500 - 1000 olfactory receptors (ORX) *See* Buck et al., (1991) *Cell* **65,** 175-187. These receptors are expressed mainly in the olfactory epithelium and have been found in a number of species including mammals, birds, amphibians, and fish. *See* Buck et al., *supra*, (1991) *Cell* **65,** 175-187; Selbie et al., (1992) *Mol. Brain Res.* **13,** 159-163; Rouquier et al., (1998) *Nature Genet.* **18,** 243-50.; Issel-Tarver et al., (1997) *Genetics* **145,** 185-195; Sullivan et al., (1996) *Proc. Natl. Acad. Sci. USA* **93,** 884-888; Nef et al., (1992) *Proc. Natl. Acad. Sci USA* **89,** 8948-8952; Leibovici et al., (1996) *Dev. Biol.* **175,** 118-131; Freitag et al., (1995) *Neuron* **15,** 1383-1392; Ngai et al., (1993) *Cell* **72,** 657-666.

All of these receptors belong to the G protein-coupled receptor (GPCR) superfamily and share features of sequence and structure, such as seven hydrophobic transmembrane domains (7TM).

The sense of smell plays an important role in mammalian social behavior, location of food and detection of predators. However, mammals vary in their olfactory ability. *See* Moulton (1967) *Am. Zool.* **7,** 421-429; Stoddart (1980) *The ecology of vertebrate olfaction* (Chapman and Hall, New York).

In primates, the sense of smell is greatly reduced (*i.e.*, microsmatic) with respect to other mammals such as dogs or rodents. *See* Moulton, *supra;* Stoddart, *supra*; Issel-Tarver, L., Rine, J. (1996) *Proc. Natl. Acad. Sci. USA* **93,** 10897-10902.

Various explanations for the differences in olfactory performance have been hypothesized. Differences in the anatomical structures (size, location) devoted to olfaction could

partly explain these differences. For example, dogs, which have an olfactory sensitivity up to 100 times greater than humans, have on average ~100 cm^2 of olfactory epithelium while

humans have only 10 cm^2.

Variations in the size and diversity of the expressed ORX gene family could also account for these differences. It has recently been demonstrated that the human ORX gene repertoire is distributed in over 25 chromosomal sites. Over 70% of these ORX genes are pseudogenes, *i.e.* the sequences have accumulated deleterious mutations such as in-frame stop codons and/or indel frameshifts. *See* Rouquier et al., (1998) *Nature Genet.* **18,** 243-50. Thus, the reduction of the sense of smell observed in primates could parallel the reduction of the number of functional ORX genes.

SUMMARY OF THE INVENTION

The invention is based, in part, upon the discovery of novel polynucleotide sequences encoding novel polypeptides.

Accordingly, in one aspect, the invention provides an isolated nucleic acid molecule that includes the sequence an ORX nucleic acid molecule or a fragment, homolog, analog or derivative thereof. The nucleic acid can include, *e.g.*, a nucleic acid sequence encoding a polypeptide at least 80% identical to a polypeptide that includes the amino acid sequence of an ORX polypeptide. The nucleic acid can be, *e.g.,* a genomic DNA fragment, or a cDNA molecule.

Also included in the invention is a vector containing one or more of the nucleic acids described herein, and a cell containing the vectors or nucleic acids described herein.

The invention is also directed to host cells transformed with a vector comprising any of the nucleic acid molecules described above.

In another aspect, the invention includes a pharmaceutical composition that includes an ORX nucleic acid and a pharmaceutically acceptable carrier or diluent.

In a further aspect, the invention includes a substantially purified ORX polypeptide, *e.g.,* any of the ORX polypeptides encoded by an ORX nucleic acid, and fragments, homologs, analogs, and derivatives thereof. The invention also includes a pharmaceutical composition that includes an ORX polypeptide and a pharmaceutically acceptable carrier or diluent.

In still a further aspect, the invention provides an antibody that binds specifically to a ORX polypeptide. The antibody can be, *e.g.*, a monoclonal or polyclonal antibody, and fragments, homologs, analogs, and derivatives thereof. The invention also includes a pharmaceutical composition including ORX antibody and a pharmaceutically acceptable carrier or diluent. The invention is also directed to isolated antibodies that bind to an epitope on a polypeptide encoded by any of the nucleic acid molecules described above.

The invention also includes kits comprising any of the pharmaceutical compositions described above.

The invention further provides a method for producing an ORX polypeptide by providing a cell containing an ORX nucleic acid, *e.g.*, a vector that includes an ORX nucleic acid, and culturing the cell under conditions sufficient to express the ORX polypeptide encoded by the nucleic acid. The expressed ORX polypeptide is then recovered from the cell. Preferably, the cell produces little or no endogenous ORX polypeptide. The cell can be, *e.g.*, a prokaryotic cell or eukaryotic cell.

The invention is also directed to methods of identifying an ORX polypeptide or nucleic acid in a sample by contacting the sample with a compound that specifically binds to the polypeptide or nucleic acid, and detecting complex formation, if present.

The invention further provides methods of identifying a compound that modulates the activity of an ORX polypeptide by contacting an ORX polypeptide with a compound and determining whether the ORX polypeptide activity is modified.

The invention is also directed to compounds that modulate ORX polypeptide activity identified by contacting an ORX polypeptide with the compound and determining whether the compound modifies activity of the ORX polypeptide, binds to the ORX polypeptide, or binds to a nucleic acid molecule encoding an ORX polypeptide.

The invention also provides a method for assessing the olfactory acuity of a subject by providing a biological sample comprising nucleic acids from the subject, identifying a plurality of nucleic acid sequences homologous to an olfactory receptor nucleic acid sequence, determining the number of sequences containing open-reading frames, determining the number of sequences containing olfactory receptor pseudogenes, and comparing the number of open-reading frames to the number of pseudogenes to assess the olfactory acuity of the subject. In one embodiment, the invention provides a method of determining the plurality of nucleic acids

using a pair of primers that selectively amplify an olfactory receptor nucleic acid sequence. In a further embodiment, this pair of primers includes OR5B-OR3B (OR5B (TM2), 5'-CCCATGTA(T/C)TT(G/C/T)TT(C/T)CTC(A/G/T)(G/C)(C/T)AA(C/T)(T/C)T(G/A)TC-3' (SEQ ID NO: 432) and 5'-AG(A/G)C(A/T)(A/G)TAIATGAAIGG(A/G)TTCAICAT-3' (SEQ ID NO:433). In a still further embodiment, the ratio of the number of sequences containing open-reading frames to the number of sequences containing olfactory receptor pseudogenes is calculated and compared to a reference ratio for an organism whose olfactory acuity is known.

Unless otherwise defined, all technical and scientific terms used herein have the same meaning as commonly understood by one of ordinary skill in the art to which this invention belongs. Although methods and materials similar or equivalent to those described herein can be used in the practice or testing of the present invention, suitable methods and materials are described below. All publications, patent applications, patents, and other references mentioned herein are incorporated by reference in their entirety. In the case of conflict, the present specification, including definitions, will control. In addition, the materials, methods, and examples are illustrative only and not intended to be limiting.

Other features and advantages of the invention will be apparent from the following detailed description and claims.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a schematic phylogeny tree of the primate species used in the Examples.

FIG. 2 is a comparison of the deduced protein ORX sequences obtained from the different primate species characterized. The dendogram was established using the PileUp program from the GCG Package. Percent amino acid similarity (ASI) was determined by pairwise sequence comparisons using the Gap program and is indicated along the abscissa of the tree. Sequences obtained from the literature are indicated by an asterisk. For example, human ORX sequences derived from the use of the OR3B/OR5B primers and representing the main ORX families were selected from Rouquier et al., *Nature Genet.* (1998) 18, 243-50 and Rouquier et al. (1998) *Hum. Mol. Genet.* 7, 1337-1345. Dog (CfOLF1 and its human counterpart HsOLF1; CfOLF2) and chicken (COR4) sequences were selected from Issel-Tarver et al. (1997) *Genetics* 145, 185-195 and Leibovici et al., (1996) *Dev. Biol.* 175, 118-131, respectively. ORX families (greater than 40% ASI) are indicated by open circles and

subfamilies (greater than 60% ASI) are indicated by open squares. The main family was arbitrarily named family 1 and subdivided in two groups of subfamilies, 1-I and 1-II , which are indicated by ovals. Group 1-II further comprises subfamilies A and B. Beside each sequence name, black dots indicate sequences derived from the use of the OR3B/OR5B consensus primers, black squares those derived from the OR3.1/7.1 consensus primers, and black rectangles indicate potentially functional genes (uninterrupted ORFs). In the case of HSA 912-93 (black rectangle and double asterisk), the sequence contains only one nonsense point mutation in human, but potentially codes in other primates. *See* Rouquier et al. (1998) *Hum. Mol. Genet.* 7, 1337-1345. In FIG. 2, the following abbreviations are used: human, HSA; chimpanzee, PTR; gorilla, GGO; orangutan, PPY; gibbon, HLA; macaque, MSY; baboon, PPA; marmoset, CJA; squirrel-monkey, SSC and SBO; lemur, EFU and ERU; zebrafish, DRE.

DETAILED DESCRIPTION OF THE INVENTION

Included in the invention are the novel nucleic acid sequences and their polypeptides. The sequences are collectively referred to as "ORX nucleic acids" or "ORX polynucleotides" and the corresponding encoded polypeptides are referred to as "ORX polypeptides" or "ORX proteins." Unless indicated otherwise, "ORX" is meant to refer to any of the novel sequences disclosed herein.

The ORX nucleic acids and polypeptides are described in more detail below.

OR1

```
LOCUS     AF127814    649 bp   DNA          PRI     28-FEB-2000
DEFINITION  Papio hamadryas olfactory receptor (PPA13) gene, partial cds.
ACCESSION   AF127814
KEYWORDS    .
SOURCE      baboon.
  ORGANISM  Papio hamadryas
            Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
            Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
            Papio.
REFERENCE   1  (bases 1 to 649)
  AUTHORS   Giorgi,D.G. and Rouquier,S.P.
  TITLE     The olfactory gene repertoire in primates and mouse: evidence for
            reduction of function in primates
  JOURNAL   Unpublished
REFERENCE   2  (bases 1 to 649)
  AUTHORS   Giorgi,D.G. and Rouquier,S.P.
```

TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..649
/organism="Papio hamadryas"
/db_xref="taxon:9557"
gene <1..>649
/gene="PPA13"
CDS <1..>649
/gene="PPA13"
/codon_start=2
/product="olfactory receptor"
/translation="WVDICFSTCIVPKMLVNIQTKNKTISYMDCLTQVYFSMFFPILG
TLLLTVMAYDRFVAVCHPLHYITIMNPRLCGLLVFVTWLIGVMTSLLHISLMTHLTFC
KDFEIPHFFCELTHILQLACSDTFLNSTLIYVMTGVLGVFPLLGIIFSYSRIASSIRK
MSSSGGKEKALSTCGSHLSVVSLFYGTGIGVHFTSAVTHSSQNISVASVMYTVVTP" (SEQ ID NO:2).
BASE COUNT 128 a 188 c 130 g 203 t
ORIGIN
1 ctgggttgac atctgtttca gcacctgcat cgtccccaag atgctggtga acatccagac
61 caagaacaaa acgatttctt acatggactg cctcacccag gtctatttct ccatgttttt
121 tcctattctg ggcacactac tcctgaccgt gatggcctat gaccggtttg tggccgtctg
181 ccacccccctg cactatataa ccatcatgaa cccccgcctc tgtggcctcc tggtttttgt
241 cacgtggctc attggtgtca tgacgtccct cctccatatt tctctgatga cacatctaac
301 cttctgtaaa gattttgaaa ttccacattt tttctgcgaa ctgacacata tcctccagct
361 ggcctgctct gataccttcc tgaacagcac gttgatatat gttatgacgg gtgtgctggg
421 cgtttttccc ctccttggga tcattttctc ttattcacga atcgcttcat ccataaggaa
481 gatgtcctca tctgggggaa aagagaaagc actttctacc tgtggctctc acctctccgt
541 cgtttcttta ttttatggga caggcattgg ggtccacttc acttctgcgg tgactcattc
601 ttcccagaac atctccgtgg cctcggtgat gtacacggtg gttaccccc (SEQ ID NO:1).

OR2

LOCUS AF127815 642 bp DNA PRI 28-FEB-2000
DEFINITION Papio hamadryas PPA14 pseudogene, partial sequence.
ACCESSION AF127815
KEYWORDS .
SOURCE baboon.
ORGANISM Papio hamadryas
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia; Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae; Papio.
REFERENCE 1 (bases 1 to 642)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 642)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..642

/organism="Papio hamadryas"
/db_xref="taxon:9557"
gene <1..>642
/gene="PPA14"
/pseudo
BASE COUNT 123 a 171 c 125 g 223 t
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121 cgcatgtatg gaaagtctgc tcctggctgt gatggcctat gaccggtttg tggccatctg
181 tcacccccta cactgcccag tcatcatgaa cccacgcctt tgtggctttt tagttttggt
241 gtcttttctt cttagcctgt tggattccca gctacacaat ttgattgtgt tacaacttac
301 ctgcttcaat gatgtggaaa tctctaaatt tttctgtgac ccttctcaac ttctcaatcc
361 tagcctgctc tgacacataa catagtcgta tattttattg gtaccatatt tggttttctt
421 cctctctcag ggatcctttt cttttactat aaaattgttt cctccattcc gagagttcgc
481 tcttcaggta ggaagtataa agccttctcc acctgcagct ctcacctttc agttgtttgc
541 ttatttttatg gaacagccct tggagggtac ctcagttcag ctgtctctct ccccccccagg
601 aagggtgcag cggcctcagt gatgtacatg gtggtcaccc cc (SEQ ID NO:3).

OR3

LOCUS AF127816 649 bp DNA PRI 28-FEB-2000
DEFINITION Papio hamadryas olfactory receptor (PPA15) gene, partial cds.
ACCESSION AF127816
KEYWORDS .
SOURCE baboon.
ORGANISM Papio hamadryas
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Papio.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..649
/organism="Papio hamadryas"
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gene <1..>649
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CDS <1..>649
/gene="PPA15"
/codon_start=2
/product="olfactory receptor"
/translation="WVDICFSTCIVPKMLVNIQTKNKTISYMDCLTQVYFSMFFPILD
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KDFEIPHFFCELTHILQLACSDTFLNSTLIYVMTGVLGVFPLLGIIFSYSRIASSIRK
MSSSGGKEKALSTCGSHLSVVSLFYGTGIGVHFTSAVTHSSQNISVASVMYTVVTP" (SEQ ID
NO:5).

BASE COUNT 130 a 188 c 128 g 203 t
ORIGIN
1 ctgggttgac atctgtttca gcacctgcat cgtccccaag atgctggtga acatccagac
61 caagaacaaa acgatttctt acatggactg cctcacccag gtctatttct ccatgttttt
121 tcctattctg gacacactac tcctgaccgt gatggcctat gaccggtttg tggccgtctg
181 ccacccccctg cactatataa ccatcatgaa cccccgcctc tgtggcctcc tggtttttgt
241 cacgtggctc attggtgtca tgacatccct cctccatatt tctctgatga cacatctaac
301 cttctgtaaa gattttgaaa ttccacattt tttctgcgaa ctgacacata tcctccagct
361 ggcctgctct gataccttcc tgaacagcac gttgatatat gttatgacgg gtgtgctggg
421 cgtttttccc ctccttggga tcattttctc ttattcacga atcgcttcat ccataaggaa
481 gatgtcctca tctgggggaa aagagaaagc actttctacc tgtggctctc acctctccgt
541 cgtttcttta ttttatggga caggcattgg ggtccacttc acttctgcgg tgactcattc
601 ttcccagaac atctccgtgg cctcggtgat gtacacggtg gttaccccc (SEQ ID NO:4).

OR4

LOCUS AF127817 649 bp DNA PRI 28-FEB-2000
DEFINITION Papio hamadryas olfactory receptor (PPA16) gene, partial cds.
ACCESSION AF127817
KEYWORDS .
SOURCE baboon.
ORGANISM Papio hamadryas
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Papio.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..649
/organism="Papio hamadryas"
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CDS <1..>649
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IKMEIPHFFCDLPEVLKLACSDTFINNVVIYFATGILAVIPFTGILFSYYKIVFSVLR
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BASE COUNT 130 a 176 c 136 g 207 t
ORIGIN
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121 tcctattctg gacacactac tcctgaccgt gatggcctat gaccggtttg tggccatcta

181 tcactccctg cactacacgg tcatcatgag cccccggctc tgtggactgc tggttctggg
241 atcctggtgc atcagtgtca tgggttccct gcttgagacc ttgactgttt tgaggctgtc
301 cttctgcatc aaaatggaaa ttccacactt tttttgtgat cttcctgaag tcctgaagct
361 cgcctgttct gacaccttca tcaataatgt agtgatatac tttgcaactg gcattctggc
421 tgtgattccc tttactggaa tacttttctc ttactataaa attgttttct ctgtactgag
481 gatttcctca gctgggggaa agtacaaagc cttttccacc tgtggttccc acctctcaat
541 ggtcagcttg ttctatggca cgggccttgg ggtctatctc agttctgcag ctataccatc
601 ttctaggaca agtctggtgg cctcagtgat gtacaccatg gtcaccccc (SEQ ID NO:6).

OR5

LOCUS AF127818 649 bp DNA PRI 28-FEB-2000
DEFINITION Papio hamadryas olfactory receptor (PPA41) gene, partial cds.
ACCESSION AF127818
KEYWORDS .
SOURCE baboon.
ORGANISM Papio hamadryas
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Papio.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..649
/organism="Papio hamadryas"
/db_xref="taxon:9557"
gene <1..>649
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CDS <1..>649
/gene="PPA41"
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/product="olfactory receptor"
/translation="WVDICFSTCIVPKMLVNIQTKNKTISYMDCLTQVYFSMFFPILD
TLLLTVMAYDRFVAVCHPLHYITIMNPRLCGLLVFVTWLIGVMTSLLHISLMTHLTFC
KDFEIPHFFCELTHILQLACSDTFLNSTLIYVMTGVLGVFPLLGIIFSYSRIASSIRK
MSSSGGKEKALSTCGSHLSVVSLFYGTGIGVHFTSAVTHSSQNISVASVMYTVVTP" (SEQ ID NO:9).
BASE COUNT 130 a 188 c 128 g 203 t
ORIGIN
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121 tcctattctg gacacactac tcctgaccgt gatggcctat gaccggtttg tggccgtctg
181 ccacccccctg cactatataa ccatcatgaa cccccgcctc tgtggcctcc tggtttttgt
241 cacgtggctc attggtgtca tgacatccct cctccatatt tctctgatga cacatctaac
301 cttctgtaaa gattttgaaa ttccacattt tttctgcgaa ctgacacata tcctccagct
361 ggcctgctct gataccttcc tgaacagcac gttgatatat gttatgacgg gtgtgctggg
421 cgtttttccc ctccttggga tcattttctc ttattcacga atcgcttcat ccataaggaa

481 gatgtcctca tctgggggaa aagagaaagc actttctacc tgtggctctc acctctccgt
541 cgtttcttta ttttatggga caggcattgg ggtccacttc acttctgcgg tgactcattc
601 ttcccagaac atctccgtgg cctcggtgat gtacacggtg gttaccccc (SEQ ID NO:8).

OR6

LOCUS AF127819 649 bp DNA PRI 28-FEB-2000
DEFINITION Papio hamadryas olfactory receptor (PPA42) gene, partial cds.
ACCESSION AF127819
KEYWORDS .
SOURCE baboon.
ORGANISM Papio hamadryas
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Papio.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
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/gene="PPA42"
CDS <1..>649
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/product="olfactory receptor"
/translation="LVDFCLATNTIPKMLVSLQTRSKAISYPCCLTQMYFFHFFGIVD
SIIIAMMAYDRFVAICHPLHYATIMSPRLCGLLVGVPWAFSCFISLTHILLMARLVFC
GSHEVPHYFCDLTPILRLSCTDTSVNRIFILIVAGMVIATPFICILASYARILAAIMK
VPSAGGRKKAFSTCSSHLSVVALFYGTTIGVYLCPSSVRTAVKEKASAVMYTAVTP" (SEQ
ID NO:11).
BASE COUNT 111 a 224 c 146 g 168 t
ORIGIN
1 cctggttgat ttctgtctgg ccaccaacac catccccaag atgctggtga gccttcaaac
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121 cggcatcgtg gacagcatca taatcgccat gatggcttat gaccggttcg tggccatctg
181 ccacccgttg cactacgcca cgatcatgag cccacgcctc tgtggtctgc tggtcggcgt
241 cccctgggcg ttttcctgct tcatctctct cacccacatc ctcctgatgg cccgcctcgt
301 tttctgcggc agccacgagg tgcctcacta cttctgcgac ctcactccca tcctccgact
361 ttcgtgcaca gacacatcag tgaacaggat cttcatcctc attgtggcag ggatggtgat
421 agccacgccc ttcatctgca tcctggcttc ctatgctcgc atccttgcgg ccatcatgaa
481 ggtcccctct gcaggcggca ggaagaaagc cttctccacc tgcagctccc acctgtctgt
541 ggttgctctc ttctatggga ccaccattgg tgtctatctg tgtcctctct cggtccgcac
601 ggctgtgaag gagaaagctt ctgccgtgat gtacacagca gtcacccccc (SEQ ID NO:10).

OR7

LOCUS AF127820 641 bp DNA PRI 28-FEB-2000
DEFINITION Papio hamadryas PPA43 pseudogene, partial sequence.
ACCESSION AF127820
KEYWORDS .
SOURCE baboon.
ORGANISM Papio hamadryas
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Papio.
REFERENCE 1 (bases 1 to 641)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 641)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..641
/organism="Papio hamadryas"
/db_xref="taxon:9557"
gene <1..>641
/gene="PPA43"
/pseudo
BASE COUNT 126 a 172 c 123 g 220 t
ORIGIN
1 cttgcctgac atcagtttca ccttggccat ggtccccaag atgattgtgg acatgcaatc
61 gcatagcaga gtcatctccc acgcggactg cctggcacag atgtctttct ttgtcctttt
121 tgcatgtata gatgacatgc tcctgactgt gatggcctat aactgatttg tggccatctg
181 tcacccccctg cactacccag tcatcatgaa tcctcacttc tgtgtcttct tagttttggt
241 gtctttttcg tcagcgtgtt ggattcccag ctgcacaatt tgattgtgtt acaacttacc
301 tgcttcaatg atgtggaaat ctctaaattt ttctgtgacc cttctcaact tctcaatcct
361 agcctgctct gacacataac atagtcgtat attttattgg taccatattt ggttttcttc
421 ctctctcagg gatccttttc ttttactata aaattgtttc ctccattccg agagttcgct
481 cttcaggtag gaagtataaa gccttctcca cctgcagctc tcacctttca gttgtttgct
541 tattttatgg aacagccctt ggagggtacc tcagttcagc tgtctctctc ccccccagga
601 agggtgcagc ggcctcagtg atgtacatgg tggtcacccc c (SEQ ID NO:12).

OR8

LOCUS AF127821 649 bp DNA PRI 28-FEB-2000
DEFINITION Papio hamadryas olfactory receptor (PPA68) gene, partial cds.
ACCESSION AF127821
KEYWORDS .
SOURCE baboon.
ORGANISM Papio hamadryas
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Papio.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for

reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..649
/organism="Papio hamadryas"
/db_xref="taxon:9557"
gene <1..>649
/gene="PPA68"
CDS <1..>649
/gene="PPA68"
/codon_start=2
/product="olfactory receptor"
/translation="FIDVCFVSTTVPKMLVNIQTQSRVITYAGCITQMCFFIFFAGLD
IFMLTVMAYDRFVAICHPLHYTVTMNPRLCGLLVLASWIMSALNSSLQSLMVLHLSFC
ADLEIPHFFCELNQVVHLACSDTFLNDMVMYLASALLGGGALSGILYSYSKIVSSIRG
TSSAQGKYKAFSTCASHLSVVSLFYGTLLGVYFSSAATRNSHSSAAASVMYTVVTP" (SEQ ID NO:14).
BASE COUNT 122 a 177 c 146 g 204 t
ORIGIN
1 cttcatagac gtctgttttg tgtccaccac tgtcccgaag atgctggtga acatccagac
61 acagagcaga gtcatcacct atgcaggctg catcacccag atgtgctttt tcatattctt
121 tgcgggactg gatatcttta tgctgaccgt gatggcctat gacaggtttg tggccatctg
181 tcacccccctg cactacacgg tcaccatgaa ccccaggctc tgtggactgc tggttctggc
241 gtcctggatc atgagtgccc tgaattcttc gttgcaaagc ttaatggtat tgcacctttc
301 cttctgtgca gacttggaaa ttccccactt tttctgtgaa cttaatcagg tggtccacct
361 tgcctgttct gacacctttc ttaatgacat ggtgatgtat ttggcatctg cgctgctggg
421 cggtggtgcc ctctctggga tcctttattc ttattctaag atcgtttcct ccatacgtgg
481 aacctcgtca gctcagggga agtacaaggc attttccacc tgtgcatctc acctctcggt
541 tgtctcctta ttttatggta cgctcctagg agtgtacttt agttctgctg caacccgtaa
601 ctcacactca agtgctgcag cctcggtgat gtacactgtg gttaccccc (SEQ ID NO:13).

OR9

LOCUS AF127822 649 bp DNA PRI 28-FEB-2000
DEFINITION Papio hamadryas olfactory receptor (PPA72) gene, partial cds.
ACCESSION AF127822
KEYWORDS .
SOURCE baboon.
ORGANISM Papio hamadryas
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia; Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae; Papio.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission

JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..649
/organism="Papio hamadryas"
/db_xref="taxon:9557"
gene <1..>649
/gene="PPA72"
CDS <1..>649
/gene="PPA72"
/codon_start=2
/product="olfactory receptor"
/translation="FIDICFVSTTVPKMLVNIQTQSRVITYAGCITQMCFFIFFAGLD
IFMLTVMAFDRFVAICHPLHYTVTMNPKLCGLLVLASWIMNALNSSLQSLIVLRLSFC
TDLEIPHFFCELNQVVHLACSDTFLNDMGMYMASALLGGGALSGILYSYSKILSSIRG
TSSAQGKYKAFSTCASHLSVVSLFYGTLLGVYFSSAATRNSHSSAAASVMYTVVTP" (SEQ ID NO:16).
BASE COUNT 124 a 179 c 144 g 202 t
ORIGIN
1 cttcatagac atctgttttg tgtccaccac tgtcccgaag atgctggtga acatccagac
61 acagagcaga gtcatcacct atgcaggctg catcacccag atgtgctttt tcatattctt
121 tgcgggactg gatatcttta tgctgaccgt gatggccttt gaccggtttg tggccatctg
181 tcacccccctg cactacacgg tcaccatgaa ccccaagctc tgtgggctgc tggttctggc
241 gtcctggatc atgaatgccc tgaattcctc gttacaaagc ttaatagtgc tgcggctttc
301 cttctgcaca gacttggaaa ttccccactt tttctgtgaa cttaatcagg tggtccacct
361 tgcctgttct gacacctttc ttaatgacat ggggatgtat atggcatctg ctctgctggg
421 cggtggtgcc ctctctggga tcctttattc ttattctaag atcctttcct ccatacgtgg
481 aacctcgtca gctcagggga agtacaaggc attttccacc tgtgcatctc acctctcggt
541 tgtctcttta ttttatggta cgctcctagg agtgtacttt agttctgctg caactcgtaa
601 ctcacactca agtgctgcag cctcggtgat gtacacggtg gttaccccc (SEQ ID NO:15).

OR10

LOCUS AF127823 649 bp DNA PRI 28-FEB-2000
DEFINITION Papio hamadryas olfactory receptor (PPA79) gene, partial cds.
ACCESSION AF127823
KEYWORDS .
SOURCE baboon.
ORGANISM Papio hamadryas
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia; Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae; Papio.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..649
/organism="Papio hamadryas"

/db_xref="taxon:9557"
gene <1..>649
/gene="PPA79"
CDS <1..>649
/gene="PPA79"
/codon_start=2
/product="olfactory receptor"
/translation="LVDVSYATSIVPQLLAHFLAEHKAISLQSCAAQLFFSLALGGIE
FVLLAVMAYDRYVAVCDPLRYSATMHGALCAKLAITSWVSGSINSLMHTTITFQLPMC
TNKFINHIFCEILAVIRLACVDTSSNEVTIMVSSIVLLMTPLCLVLLSYIRIISTILK
IQSREGRRKAFHTCASHLTVVALCYGMAIFTYIHPHSSPSVLQEKLISLFYAILTP" (SEQ ID NO:18).
BASE COUNT 135 a 185 c 133 g 196 t
ORIGIN
1 ccttgtcgat gtctcctatg ccacaagcat agtccctcag ctgctggcac attttcttgc
61 agaacataaa gccatctcgt tgcagagctg tgcagcccaa ttatttttct ccctggcctt
121 gggtgggatt gagtttgttc tcctggcagt gatggcctat gaccgctatg tggctgtgtg
181 tgacccccctg cgatactcag ccaccatgca tggagcgcta tgtgctaagt tggccatcac
241 atcctgggtc agtggatcca ttaactctct catgcatacc accatcacct ttcagctgcc
301 catgtgcaca aacaagttta ttaatcatat attctgtgaa attctagctg tgatcaggct
361 ggcttgtgtg gacacctcct ccaacgaggt caccatcatg gtgtctagca ttgttcttct
421 gatgacaccc ttatgtctgg ttcttttgtc ttacatccgg atcatctcca ccatcttaaa
481 gatccagtcc agagaaggaa ggaggaaagc cttccacacg tgtgcctctc acctcacagt
541 ggttgccctg tgctatggca tggccatttt cacttacatc catccccact ccagtccctc
601 tgtccttcag gagaagttga tctctctctt ttatgccatt ttgacacca (SEQ ID NO:17).

OR11

LOCUS AF127824 649 bp DNA PRI 28-FEB-2000
DEFINITION Pan troglodytes olfactory receptor (PTR12) gene, partial cds.
ACCESSION AF127824
KEYWORDS .
SOURCE chimpanzee.
ORGANISM Pan troglodytes
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pan.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..649
/organism="Pan troglodytes"
/db_xref="taxon:9598"
gene <1..>649
/gene="PTR12"
CDS <1..>649
/gene="PTR12"
/codon_start=2

/product="olfactory receptor"
/translation="FLEIGFNLVIVPKMLGTLLAQDTTISFLGCATQMYFFFFFGVAE
CFLLATVAYDRYVAICSPLHYPVIMNQRTRAKLAAASWFPGFPVATVQTTWLFSFPFC
RTNKVNHFFCDSPPVLRLVCADTALFEIYAIVGTILVVMIPCLLILCSYTRIAAAILK
IPSAKGKNKAFSTRSSHLLVVSLFYISLSLTYFRPKSNNSPEGKKLLSLSYTVMTP" (SEQ ID NO:20).

BASE COUNT 132 a 193 c 129 g 195 t

ORIGIN

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   1 tttcctggag attggcttca acctagtcat tgtgcccaaa atgctgggga ccctgcttgc
  61 ccaggacaca accatctcct tccttggctg tgccactcag atgtatttct tcttcttctt
 121 tggagttgct gaatgcttcc tcctggctac cgtggcatat gaccgctatg tggccatctg
 181 cagtcccttg cactacccag tcatcatgaa ccaaaggaca cgggccaaac tggctgctgc
 241 ctcctggttc ccaggctttc ctgtagctac tgtgcagacc acatggctct tcagttttcc
 301 attctgtcgc accaacaagg tgaaccactt cttctgtgac agcccacctg tgctgaggct
 361 ggtctgtgca gacacagcac tgtttgagat ctacgccatc gtcggaacca ttctggtggt
 421 catgatcccc tgcttgctga tcttgtgttc ctatactcgc attgctgctg ccatcctcaa
 481 gatcccatca gctaaaggga agaataaagc cttttctaca cgttcctcac acctccttgt
 541 tgtctctctt ttctatatat cattaagcct cacatatttt cggcctaaat caaataattc
 601 tcctgagggc aagaagctgc tatcgttgtc ctacactgtt atgactccc (SEQ ID NO:19).
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OR12

```
LOCUS     AF127825    650 bp   DNA          PRI     28-FEB-2000
DEFINITION  Pan troglodytes PTR2 pseudogene, partial sequence.
ACCESSION   AF127825
KEYWORDS    .
SOURCE      chimpanzee.
  ORGANISM  Pan troglodytes
            Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
            Eutheria; Primates; Catarrhini; Hominidae; Pan.
REFERENCE   1  (bases 1 to 650)
  AUTHORS   Giorgi,D.G. and Rouquier,S.P.
  TITLE     The olfactory gene repertoire in primates and mouse: evidence for
            reduction of function in primates
  JOURNAL   Unpublished
REFERENCE   2  (bases 1 to 650)
  AUTHORS   Giorgi,D.G. and Rouquier,S.P.
  TITLE     Direct Submission
  JOURNAL   Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
            Montpellier Cedex 5 34396, France
FEATURES             Location/Qualifiers
     source          1..650
                     /organism="Pan troglodytes"
                     /db_xref="taxon:9598"
     gene            <1..>650
                     /gene="PTR2"
                     /pseudo
BASE COUNT     127 a    202 c    131 g    190 t
ORIGIN
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  61 cgggactcag accatctcct tctgtggctg tttcacacag atgtatttcg ttttcatgct
 121 tgtggacatg gacaatttcc tcctagctgt gatggcctat gaccgctttg tcgccgtgtg
 181 ccacccctta cattacacag caaagatgac ccatcagctc tgtgccctgc tggttgctgg
 241 attatgggtg gttgccaacc tgaatgtcct tctgcacacc ctgctgatgg ctcgactctc
 301 attctgtgca gacaatgcca tccctcactt cttctgcgat gtgactcccc tactgaaact
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361 ctcctgctca gacacacacc tcaatgaggt cataatcctt agtgagggtg ccctggtcat
421 gatcacccca tttctttgca tcctggcttc ttatatgcac atcacctgca ctgtcctgag
481 ggtcccatcc acaaagggaa ggtggtaagc cttctccacc tgtggctctc acctggctgt
541 ggttctacct cttctatggc accatcattg ctgtgtattt taaccctctg tcctcccact
601 cagcagagaa agacactacg gctactgtgt tgtatacagt agtgactccc (SEQ ID NO:21).

OR13

LOCUS AF127826 649 bp DNA PRI 28-FEB-2000
DEFINITION Pan troglodytes PTR3 pseudogene, partial sequence.
ACCESSION AF127826
KEYWORDS .
SOURCE chimpanzee.
ORGANISM Pan troglodytes
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pan.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..649
/organism="Pan troglodytes"
/db_xref="taxon:9598"
gene <1..>649
/gene="PTR3"
/pseudo
BASE COUNT 146 a 166 c 121 g 216 t
ORIGIN
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61 ggaagacaga accatctcct tcacaggatg catcatgcaa ttcttcctgg cgtgtatatg
121 tgcagtggca gaaacattca tgctggcagt gatggcctat gattgatacg tggcagtgtg
181 taacccttg ctctacacag ttgtcaggtc ccagaaactc tgtgcatcat tagtggcagg
241 gccctacaca tggggtataa tctcttctct gacactcacc tatttcctct tgtcattatc
301 cttctgtggg tctaacatca tcaataattt tgtctgtgag gactctgtca tcatctctgt
361 ctcctgctct gacccctaca tcagccaaat gctttgtttt gtcattgcaa tattcaatga
421 ggtgagcagc ttgggagtca tcctcactac ctatattttc atctttattg ctgtcataaa
481 aatgccttct gctgttgggc accaaaaagc tttctctacc tgtgcttccc acctgactgc
541 catcactatt ttccatggga ctgtcctgtt cctttattgt gtacccaact ccaaaaactc
601 atggctcata gtcaaagtag gttctgtgtt ttatacagtc atcatcccc (SEQ ID NO:22).

OR14

LOCUS AF127827 651 bp DNA PRI 28-FEB-2000
DEFINITION Pan troglodytes PTR4 pseudogene, partial sequence.
ACCESSION AF127827
KEYWORDS .
SOURCE chimpanzee.
ORGANISM Pan troglodytes

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pan.
REFERENCE 1 (bases 1 to 651)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 651)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..651
/organism="Pan troglodytes"
/db_xref="taxon:9598"
gene <1..>651
/gene="PTR4"
/pseudo
BASE COUNT 131 a 166 c 134 g 220 t
ORIGIN
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61 tcacagcaga gtcatctcct atgcaggctg cctgactcag atgtctctct ttgccatttt
121 tggaggtatg gaagagagac atgctcctga gtgtgatggc ctatgaccgg tttgtagcca
181 tctgtcacct atatcgttca gccatcttta acccgtgttt ctgtggcttc ctagatttgt
241 tgtctttttt ttttttctca gtctttcaga ctcccagctg cacaacttga ttgccttaca
301 aatgacctgc ttcaaggatg tggaaattcc taatttcttc tgggaacctt ctcaactctc
361 ccatcttgca tgttgtgaca ccttcaccag gaacatcagt atttccctgc tgccatattt
421 ggtttttcttc ctatctcaca gatcattttc tcttactata aaattgtttc ctccatgctg
481 agtgtttcat catcaggtgg gaagtataaa gccttctcca actgtgggtc tcccctgtca
541 gttgtttgct tattttatgg gaaaggcatt gggggtacc tgagttcaga tgtgtcatct
601 tcccccagaa agggtgcagt ggcctcagtg atgtacacgg tgatcaccgc c (SEQ ID NO:23).

OR15

LOCUS AF127828 657 bp DNA PRI 28-FEB-2000
DEFINITION Pan troglodytes PTR5 pseudogene, partial sequence.
ACCESSION AF127828
KEYWORDS .
SOURCE chimpanzee.
ORGANISM Pan troglodytes
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pan.
REFERENCE 1 (bases 1 to 657)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 657)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..657

/organism="Pan troglodytes"
/db_xref="taxon:9598"
gene <1..>657
/gene="PTR5"
/pseudo
BASE COUNT 128 a 173 c 137 g 219 t
ORIGIN
1 cttgcctgac atcggtttca cctccagcat ggtccccaag atgattgtgg acatccagtc
61 tcacagcaga ctcatctcct aggcaggctg cctgactccg atgtccctct ttgccatttt
121 tggaggcatg gaagagagac atgctcctga gtgtgatggc ctattacccg tttgtggcca
181 tctgtcaccc tatatatcat tcaaccatca tgaacccgtg tttctgtggc tttctagttt
241 tgttgtcttt ttttttttct cagtctttta gacgcccagc tgcacaactt gattgcctta
301 caaatgacct gcttcaagga tgtggaaatt cctaatttct tctgggaacc ttctcaactt
361 ccccatcttg catgttgcga caccctcacc aataacataa tcatgtattt ccctgctgcc
421 atatttggtt ttcttcccat ctcggggacc cttttctctt attataagat tgtttcctcc
481 attctgaggg tttcatcatc aggtgggaag tataaggcct gctccacctg tgggtctcac
541 ctgtcagttg tttgctgatt ttatggaaga tgcgttggag ggtacctcag ttcagatgtg
601 tcatcttccc tgagataggc tgcagtggcc tcagtgatgt acacggtggt caccccc (SEQ ID NO:24).

OR16

LOCUS AF127829 657 bp DNA PRI 28-FEB-2000
DEFINITION Pan troglodytes PTR6 pseudogene, partial sequence.
ACCESSION AF127829
KEYWORDS .
SOURCE chimpanzee.
ORGANISM Pan troglodytes
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pan.
REFERENCE 1 (bases 1 to 657)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 657)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..657
/organism="Pan troglodytes"
/db_xref="taxon:9598"
gene <1..>657
/gene="PTR6"
/pseudo
BASE COUNT 133 a 171 c 131 g 222 t
ORIGIN
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61 tcacagcaga gtcatctgct atgcaggttg cctgactcag atgtctctct ttgccatttt
121 tggaggcatg gaagagagac atgctcctga atgtgatggc ctatgtccgg tttgtagcca
181 tctgtcaccc tctatatcat tcagccatca tgaacccgtg tttctgtggc ttcctacttt
241 tgttgtcttt ttttttttc gcggtctttt agatgcccag ctgcacaaca tgattgcctt
301 acaaacgacc tgcttcaagg atgtggaaat tcctaatttc ttctgtgatc cttctcaact
361 accccacctt gcatgttgtg acaccttcac caataacatc atcatgtatt tccctgctgc

421 cctatttggt ttccttccca tctcggggac ccttttctct tactgtaaaa ttgtttcctc
481 cattctgagg gtttcatcat caggtgggaa gtataaacct tctccacctg tgggtctcac
541 ctgtcagttt tttgctgatt ttatggaaaa ggcgttggag ggtacctcag ttcagatgtg
601 tcatcttccc tgagaaaggc tgcagtggcc tcagtgatgt acaagatggt cactccc (SEQ ID NO:25).

OR17

LOCUS AF127830 650 bp DNA PRI 28-FEB-2000
DEFINITION Pan troglodytes PTR7 pseudogene, partial sequence.
ACCESSION AF127830
KEYWORDS .
SOURCE chimpanzee.
ORGANISM Pan troglodytes
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pan.
REFERENCE 1 (bases 1 to 650)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 650)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..650
/organism="Pan troglodytes"
/db_xref="taxon:9598"
gene <1..>650
/gene="PTR7"
/pseudo
BASE COUNT 122 a 168 c 127 g 233 t
ORIGIN
1 cttggctgac atcggttttg cctctactac tgtccccaag atgattgtgg acatccaggc
61 tcacagtaga ctcatctctt acgtaggctg cctgactcag atgtcttttt tgatcctttt
121 cgcatgtatg gaaagtctgc tcctgattgt gatggcctat gaccggttcg tgaccatctg
181 tcacccccctg cactaccaag tcatcatgag cccacgactc tgtggcttct tagttttggt
241 gtctttttt cttagccttt tggactctca gctgcacaat ttgattgtgt tacaacttac
301 ctgcttcaac gatgtagaaa tctctaattt ttttctgtga cccttcttaa cttctcaacc
361 tggcctgttc tgacacctcc attaataaca tggttgtata ttttattggt gccatatttg
421 gttttctccc tctcttaggg atccttttct cttactataa aattgtttcc tccattctga
481 gagttctctc ttcaggtggg aagtataaag ccttctccac ctgcagctct cacctgtcag
541 ttgtttgctt attttatgga acagcccttg gagggtacct cagttcagct gtgtcccttt
601 cctccaggaa gggtgcagtg gcctcagtga tgtacatggt ggtcaccccc (SEQ ID NO:26).

OR18

LOCUS AF127831 663 bp DNA PRI 28-FEB-2000
DEFINITION Pan troglodytes PTR8 pseudogene, partial sequence.
ACCESSION AF127831
KEYWORDS .
SOURCE chimpanzee.
ORGANISM Pan troglodytes
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Catarrhini; Hominidae; Pan.
REFERENCE 1 (bases 1 to 663)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 663)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..663
/organism="Pan troglodytes"
/db_xref="taxon:9598"
gene <1..>663
/gene="PTR8"
/pseudo
BASE COUNT 129 a 171 c 139 g 224 t
ORIGIN
1 cttgcctgac atcggtttca cctccaccac ggtccccaag atgattgtgg acatccagtc
61 tcacagcaga gtcatttcct atgcaggctg cctgactcag atgtctctct ttgccatttt
121 tggaggcatg gaagagagac atgctcctga atgtgacggc ctatgaccgg tttgtagcca
181 tctgtcaccc tctatatcgt tcagccatct tgaacccgtg tttctgtggc tttctaggtt
241 ttttgtcttt gatttttttt tttttctcag tcttttagac tcccagctgc acaacttgat
301 tgccttacaa atgacctgct tcaaggatgt ggaaattcct aatttcttcc gggaaccttc
361 tcaactcccc catcttgcat gttgtgacac cttcactagg aacatcaaca tgtattttct
421 tgctgccata tttggttttc ttcccatctc ggggaccctt ttctcttact gtaaaattgt
481 ttcctccatt ctgagggttt catcatcagg tgggaagtat aaaccttcac cacttgtggg
541 tctcacctgt cagttgtttg ctgattttat ggaacaggcg ttggagggta cctcggttca
601 gatgtgtcat cttccccgag aaagggtgca gtggcctcag tgatgtacac ggtggtcacc
661 ccc (SEQ ID NO:27).

OR19

LOCUS AF127832 677 bp DNA PRI 28-FEB-2000
DEFINITION Pan troglodytes PTR9 pseudogene, partial sequence.
ACCESSION AF127832
KEYWORDS .
SOURCE chimpanzee.
ORGANISM Pan troglodytes
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia; Eutheria; Primates; Catarrhini; Hominidae; Pan.
REFERENCE 1 (bases 1 to 677)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 677)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..677

/organism="Pan troglodytes"
/db_xref="taxon:9598"
gene <1..>677
/gene="PTR9"
/pseudo
BASE COUNT 129 a 170 c 143 g 235 t
ORIGIN
1 cttgactgac atcggtttca cctccatcac agtccccaag atgattgtgg acatctagtc
61 tcacagcaga gtcatctgct atgcaggttg cctgactcag atgtctctct ttgccatttt
121 tggaggcatg gaagagagac atgctcctga gtgtgatggc ctatggccgg tttgtagcca
181 tctgtcaccc tccatatcgt tcagccattt tgaacccgtg tttctgtggc ttcctagatt
241 tgttgtcctt gttttttttt gttttgtttt gttttttttct caggctttta gactcccagc
301 tgcacaactt gattgcctta caaatgacgt gtttcaagga tgtggaaatt cctaatttct
361 tctgggaacc ttctcaactc gcccatcttg catgttgtaa caccttcacc aggaatatca
421 acctgtattt ccctgctgcc gtatttggtt ttcttcccat ctcggggacc cttttctctt
481 actgtaaaat tgtttcctcc attctgaagg tttcatcatc aggtgggaac tataaagcct
541 tctccacctg tgggtctcac ctgtcagttg tttgcttatt ttatggaaca ggcgttggag
601 ggtacctcag ttcagatgtg tcatcttccc ccagaaaggg tgcagtggcc tcagtgatgt
661 acacggtggt caccccc (SEQ ID NO:28).

OR20

LOCUS AF127833 643 bp DNA PRI 28-FEB-2000
DEFINITION Hylobates lar HLA45 pseudogene, partial sequence.
ACCESSION AF127833
KEYWORDS .
SOURCE common gibbon.
ORGANISM Hylobates lar
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hylobatidae; Hylobates.
REFERENCE 1 (bases 1 to 643)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 643)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..643
/organism="Hylobates lar"
/db_xref="taxon:9580"
gene <1..>643
/gene="HLA45"
/pseudo
BASE COUNT 131 a 168 c 127 g 217 t
ORIGIN
1 ctgggctgac atcactttca cctcggccat ggttcccaag atggttgtgg acatgcagtc
61 gcatagcaga gccatctctt atgcaggctg cctgacacag atgtctttct ttgtcctttt
121 gcatgtatag aagacatgct cctgactctg atggcctatg accgatttgt ggccatctgt
181 cacccccctgc actacccagt catcgtgaat cctcacctct gtgtcttctt agttttgttg
241 tctttttcc ttagcctgtt ggattcccag ctacacagct ggattgtgtt tacaattcac
301 cttcttcaag aatggaaatc tctaattttt tctgtgaccc gtctcaactt ctcaaccttg

361 cctgttctga cagcatcatc gataacatat tatatattta gatagcccta tatttggttt
421 tcttcccatt tcagggatcc ttttgtctta gtataaaatt gtctccccca ttccgagaat
481 tccatcatca gatgggaagt ataaagcctt ctccacctgt ggctctcacc tggcagttgt
541 tgcattttat gaaacaggca ttggcgtgta cctgacttca gctgtgtcat catcccccag
601 gaatggtgtg gtggcgtcag tgatgtatgc tgtggtcacc ccc (SEQ ID NO:29).

OR21

LOCUS AF127834 648 bp DNA PRI 28-FEB-2000
DEFINITION Hylobates lar HLA46 pseudogene, partial sequence.
ACCESSION AF127834
KEYWORDS .
SOURCE common gibbon.
ORGANISM Hylobates lar
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hylobatidae; Hylobates.
REFERENCE 1 (bases 1 to 648)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 648)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..648
/organism="Hylobates lar"
/db_xref="taxon:9580"
gene <1..>648
/gene="HLA46"
/pseudo
BASE COUNT 131 a 170 c 143 g 204 t
ORIGIN
1 cttggtcgac atctgtttca cctccaccac gatgcccaag atgttggtga acatccaggc
61 acagactcaa tccatcagtt acacaggctg cctcacccaa atctgctttg tcctggtttt
121 tgttggattg gaaaatggaa ttctggtcat gatggcctat gatcgatttg tggccatctg
181 tcacccactg aggtacaatg tcatcatgaa cccaaactct gtgggctgct gcttctgctc
241 tccttcatca ttagtgtcct ggacgctctg ctgcacacgt tgatggtgct acggctgacc
301 ttctgcacag acctggaaat tccccacttt ttctgtgaac tagctcatgt tctcaagctc
361 gcctgttctg atgtcctcat taataacatc ctggtgtatt tggtgaccgg cctgttaggt
421 gttgttcctc actctgggat cattttctct tacacacgaa ttgcctcctc tgtcatgaaa
481 attccattag ctggtggaaa gtataaagct ttttccatct gcgggtcaca cttaatcgtc
541 gtttgcttgt tctatggaac agggtttggg gtgtaccttа gttctggggc tacccactcc
601 tctaggcagg gtgcaatagc atcagtgatg tataccgtgg tcaccccc (SEQ ID NO:30).

OR22

LOCUS AF127835 660 bp DNA PRI 28-FEB-2000
DEFINITION Hylobates lar HLA47 pseudogene, partial sequence.
ACCESSION AF127835
KEYWORDS .
SOURCE common gibbon.
ORGANISM Hylobates lar

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hylobatidae; Hylobates.
REFERENCE 1 (bases 1 to 660)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 660)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..660
/organism="Hylobates lar"
/db_xref="taxon:9580"
gene <1..>660
/gene="HLA47"
/pseudo
BASE COUNT 127 a 182 c 137 g 214 t
ORIGIN
1 ctcgcctgac atcggtttca cttccaccac agtccccaag attattgtgg acatcaaatc
61 tcacagcaga gtcatctcct aggcaggctg cctgactcag acctctctct ttgccatttt
121 tggaggcatg gaagagagac acgctcctga gtgtgatggc ctatgaccgg tttgtagcca
181 tctgtcaccc tctatatcat tcggccatga tgaacccgtg tttctgcggc tttctagttt
241 tgttgtcttt ttttttttct tctcagtctt ctagactccc agctgcacaa cttgattgcc
301 ttgctaacga cctgcttcaa gggtgcggaa attcctaatt tcttctgtga cccttctcaa
361 ctcccccatc ttgcatgttg tgacaccttc accaataaca taatcatgta ttttcctgct
421 gccgtatttg ggttccttcc catctcgggg acccttttcct cttactataa aatggtttcc
481 tccattctga ggctttcatc gtcaggtggg aagtataaag ccttctccac ctgtgggtct
541 catctgtcag ttgtttgctg agtttatgga agaggcgttg gaggatacct cagttcagat
601 gtgtcctctt cccccagaaa ggttgcagtg gcctcagtga tgtacacggt ggtcaccccc (SEQ ID NO:31).

OR23

LOCUS AF127836 649 bp DNA PRI 28-FEB-2000
DEFINITION Hylobates lar olfactory receptor (HLA48) gene, partial cds.
ACCESSION AF127836
KEYWORDS .
SOURCE common gibbon.
ORGANISM Hylobates lar
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hylobatidae; Hylobates.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..649

/organism="Hylobates lar"
/db_xref="taxon:9580"
gene <1..>649
/gene="HLA48"
CDS <1..>649
/gene="HLA48"
/codon_start=2
/product="olfactory receptor"
/translation="WVDICFGTCIIPKMLVNIQTKNKAISYMDCLTQVYFSMLFPILD
TLLLTVMAYDRFVAICHPLHYMIIMNPRLCGLLIFVIWLIGVMTSLLHISLMMHLIFC
KDFEIPHFFCELTHILQLARSDTFLNSTLIYFMTGVLGVFPLLGIIFSYSRIASSIRK
MSSSGGKQKALSTCGSHLSVVSLFYGTGIGVHFTSAVTHASQKISVASVMYTVVTP" (SEQ ID NO:33).

BASE COUNT 133 a 190 c 124 g 202 t

ORIGIN

1 ctgggttgac atctgtttcg gcacttgcat catccccaag atgctggtga acatccagac
61 caagaacaaa gccatctcct acatggactg cctcacacag gtctatttct ccatgctttt
121 tcctattctg gacacgctac tcctgaccgt gatggcctat gaccggtttg tggccatctg
181 ccaccctctg cactacatga tcatcatgaa cccccgcctc tgtggcctcc tgatttttgt
241 catctggctc attggtgtca tgacatccct cctccatatt tctctgatga tgcatctaat
301 cttctgtaaa gattttgaaa ttccacattt tttctgcgaa ctgacacaca tcctccagct
361 ggcccgctct gataccttcc tgaacagcac gttgatatac tttatgacag gtgtgctggg
421 cgtttttccc ctccttggga tcattttctc ttattcacga attgcttcat ccataaggaa
481 gatgtcctca tctgggggaa aacaaaaagc actttccacc tgtgggtctc acctctccgt
541 tgtttcttta ttttatggga caggcattgg ggtccacttc acttctgcag tgactcacgc
601 ttcccagaaa atctccgtgg cctcggtgat gtacactgtg gtcaccccc (SEQ ID NO:32).

OR24

LOCUS AF127837 649 bp DNA PRI 28-FEB-2000
DEFINITION Hylobates lar olfactory receptor (HLA5) gene, partial cds.
ACCESSION AF127837
KEYWORDS .
SOURCE common gibbon.
ORGANISM Hylobates lar
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hylobatidae; Hylobates.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..649
/organism="Hylobates lar"
/db_xref="taxon:9580"
gene <1..>649
/gene="HLA5"
CDS <1..>649
/gene="HLA5"

/codon_start=2
/product="olfactory receptor"
/translation="WVDICFSTCIIPKMLVNIQTKNKAISYMDCLTQVYFSMLFPILD
TLLLTVMAYDRFVAICLPLHYMIIMNPRLCGLLIFVIWLIGVMTSLLHISLMMHLIFC
KDFEIPHFFCELTHILQLACSDTFLNSTLIYFMTGVLGVFPLLGIIFSYSRIASSIRK
MSSSGGKQKALSTCGSHLSVVSLFYGTGIGVHFTSAVTHASQKISVASVMYTVVTP" (SEQ ID NO:35).

BASE COUNT 133 a 189 c 124 g 203 t

ORIGIN

1 ctgggttgac atctgtttca gcacttgcat catccccaag atgctggtga acatccagac
61 caagaacaaa gccatctcct acatggactg cctcacacag gtctatttct ccatgctttt
121 tcctattctg gacacgctac tcctgaccgt gatggcctat gaccggtttg tggccatctg
181 cctccctctg cactacatga tcatcatgaa cccccgcctc tgtggcctcc tgatttttgt
241 catctggctc attggtgtca tgacatccct cctccatatt tctctgatga tgcatctaat
301 cttctgtaaa gattttgaaa ttccacattt tttctgcgaa ctgacacaca tcctccagct
361 ggcctgctct gataccttcc tgaacagcac gttgatatac tttatgacag gtgtgctggg
421 cgtttttccc ctccttggga tcattttctc ttattcacga attgcttcat ccataaggaa
481 gatgtcctca tctgggggaa aacaaaaagc actttccacc tgtgggtctc acctctccgt
541 tgtttcttta ttttatggga caggcattgg ggtccacttc acttctgcag tgactcacgc
601 ttcccagaaa atctccgtgg cctcggtgat gtacacggtg gtcaccccc (SEQ ID NO:34).

OR25

LOCUS AF127838 651 bp DNA PRI 28-FEB-2000
DEFINITION Hylobates lar HLA6 pseudogene, partial sequence.
ACCESSION AF127838
KEYWORDS .
SOURCE common gibbon.
ORGANISM Hylobates lar
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hylobatidae; Hylobates.
REFERENCE 1 (bases 1 to 651)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 651)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..651
/organism="Hylobates lar"
/db_xref="taxon:9580"
gene <1..>651
/gene="HLA6"
/pseudo
BASE COUNT 127 a 176 c 139 g 209 t
ORIGIN
1 cttgcctgac atcggtttca ccaccaccac ggtccccgag atgattgtgg acatccaatc
61 tcacagcaga gtcatctcct aggcaggccg cctgactcac atgtctctct ttgccatttt
121 tggaggcatg gaagagagac atgctcctga gtgtgatggc ctatgacagg tttgtagcca
181 tctgtcaccc tctatatcat tcagccatca tgaacccgtg tttctgtggc tttctagttg
241 tcttttttt ctctcagtct tttagaggcc cagctgcata acttgattgc cttgctaatg

301 acctgcttca aggatgtgga aattcctaat ttcctctgtg acccttctca actccgccat
361 cttgcatgtt gtgacatctt caccaataac ataatcatgt attttcctgc tgccgtattt
421 gggttccttc ccatctcggg gacccctttcc tcttactata aaatggtttc ctccattctg
481 aggctttcat cgtcaggtgg gaagtataaa gccttctcca cctgtgggtc tcacctgtca
541 gttgtttgct gagtttatgg aagaggcgtt ggagggtacc tcagttcaga tgtgtcctct
601 tcccccagaa agtttgcagt ggcctcagtg atgtacacgg tggtcacccc c (SEQ ID NO:36).

OR26

LOCUS AF127839 644 bp DNA PRI 28-FEB-2000
DEFINITION Hylobates lar HLA7 pseudogene, partial sequence.
ACCESSION AF127839
KEYWORDS .
SOURCE common gibbon.
ORGANISM Hylobates lar
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hylobatidae; Hylobates.
REFERENCE 1 (bases 1 to 644)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 644)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..644
/organism="Hylobates lar"
/db_xref="taxon:9580"
gene <1..>644
/gene="HLA7"
/pseudo
BASE COUNT 130 a 168 c 128 g 218 t
ORIGIN
1 ctgggctgac atcactttca cctcggccat ggttcccaag atgattgtgg acatgcagtc
61 gcatagcaga gccatctctt atgcaggctg cctgacacag atgtctttct ttgtcctttt
121 tgcatgtatg gaagacatgc tcctgactct gatggcctat gaccgatttg tggccatctg
181 tcacccccctg cactacccag tcatcgtgaa tcctcacctc tgtgtcttct tagttttgtt
241 gtctttttttc cttagcctgt tggattccca gctacacagc tggattgtgt ttacaatcca
301 ccttcttcaa gaatggaaat ctctaatttt ttctgtgacc cgtctcaact tctcaacctt
361 gcctgttctg acagcatcat cgataacata ttatatattt agatagccct atatttggtt
421 ttcttcccat ttcagggatc cttttgtctt agtataaaat tgtctccccc attctgagaa
481 ttccatcgtc agatgggaag tataaagcct tctccacctg tggctctcac ctggcagttg
541 ttgcatttta tgaaacaggc attggcgtgt acctgacttc agctgtgtca tcatccccca
601 ggaatggtgt ggtggcgtca gtgatgtatg ctgtggtcac cccc (SEQ ID NO:37).

OR27

LOCUS AF127840 649 bp DNA PRI 28-FEB-2000
DEFINITION Hylobates lar olfactory receptor (HLA74) gene, partial cds.
ACCESSION AF127840
KEYWORDS .
SOURCE common gibbon.

ORGANISM Hylobates lar
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hylobatidae; Hylobates.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..649
/organism="Hylobates lar"
/db_xref="taxon:9580"
gene <1..>649
/gene="HLA74"
CDS <1..>649
/gene="HLA74"
/codon_start=2
/product="olfactory receptor"
/translation="FVDFCYSTTITPKLLENLVVEYRTISFTGCIMQFFLVCIFVGTE
TFMLAVMAYDRCVAVCNPLLYTVAMSQRLCSLLVATSYSWGIVCFLTLTYFLLELSFR
GNNIINNFVCEHAAIVAVSCSDPYVSQEITLVSATFNEISSLMMIFTSYAFIFITVMK
MPSTGGRKKAFSTCASHLTAITIFHGTILFLYCVPNSKSSWLMVKVTSVFYTVFIP" (SEQ ID
NO:39).
BASE COUNT 142 a 157 c 129 g 221 t
ORIGIN
1 ctttgttgat ttctgttatt ctactacgat tacacccaaa ctgctggaga acttggttgt
61 ggaatataga actatttcct tcacaggatg catcatgcaa ttcttccttg tctgcatatt
121 tgtagggaca gaaacattca tgctggcagt gatggcctat gaccgatgtg tggcggtgtg
181 taaccctctt ctctacacag ttgcaatgtc ccagaggctt tgctccttgt tggtggctac
241 atcatactct tgggggatag tctgtttcct gacacttacc tactttctac tggaattatc
301 cttcagagga aataatatca ttaataactt tgtctgtgag catgctgcca ttgttgctgt
361 gtcttgctct gacccctatg tgagccagga gatcacttta gtttctgcca cattcaatga
421 aataagcagt ctgatgatga ttttcacttc ctatgctttc atttttatca ctgtcatgaa
481 gatgccttcc actgggggggc gcaagaaagc gttctccacg tgtgcctccc acctgaccgc
541 cattaccatt ttccatggga ctatcctttt cctctactgt gttcctaact ccaaaagttc
601 atggctcatg gtcaaggtga cctctgtctt ttacacagtg ttcattccc (SEQ ID NO:38).

OR28

LOCUS AF127841 659 bp DNA PRI 28-FEB-2000
DEFINITION Hylobates lar HLA75 pseudogene, partial sequence.
ACCESSION AF127841
KEYWORDS .
SOURCE common gibbon.
ORGANISM Hylobates lar
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hylobatidae; Hylobates.
REFERENCE 1 (bases 1 to 659)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for

reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 659)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..659
/organism="Hylobates lar"
/db_xref="taxon:9580"
gene <1..>659
/gene="HLA75"
/pseudo
BASE COUNT 123 a 178 c 143 g 215 t
ORIGIN
1 cttgcctgac atcggtttca ccaccaccac ggtccccgag atgattgtgg acatccaatc
61 tcacagcaga gtcatctcct aggcaggccg cctgactcag atgtctctct ttgccatttt
121 tggaggcatg gaagagagac atgctcctga gtgtgacggc ctatgaccgg tttgtagcta
181 tctgtcaccc tctatatcat tcagccatca tggacccgtg tttctgtgac ttcctagttt
241 tgttgtcttt ttttttctt ctcagtcttt tcgactccca gctgcacaac ttgattgcct
301 tgctaatgac ttgcttcaag gatgtggaaa ttcctaattt cttctgtgac ccttctcaac
361 tcccccatct tgcatgttgt gacagcatca ccaataacgt catcatgtat ttccctgctg
421 ccgtatttgg tttccttccc atctcgggga ccctttttctc ttgctataaa atcgtttcct
481 ccattctgag ggtttcatca tcaggtggga ggtataaagc cttctccacc tgtgggtctc
541 acctgtcagt tgtttgctga gtttatggaa gaggtgttgg agggtacctc agttcaggtg
601 tgtcatcttc ccccagaaag ggtgcagtgg cctcagtgat gtacacggtg gtcaccccc (SEQ ID NO:40).

OR29

LOCUS AF127842 662 bp DNA PRI 28-FEB-2000
DEFINITION Hylobates lar HLA8 pseudogene, partial sequence.
ACCESSION AF127842
KEYWORDS .
SOURCE common gibbon.
ORGANISM Hylobates lar
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia; Eutheria; Primates; Catarrhini; Hylobatidae; Hylobates.
REFERENCE 1 (bases 1 to 662)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 662)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..662
/organism="Hylobates lar"
/db_xref="taxon:9580"
gene <1..>662
/gene="HLA8"
/pseudo

BASE COUNT 124 a 178 c 143 g 217 t
ORIGIN
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61 tcacagcaca gtcatctcct aggcaggctg cctgactcag atgcctctct ttgccatttt
121 tggaggcatg gaagagagac aagctcctga gtgtgatggc ctatgaccgg tttgtagcca
181 tctgtcaccc tctatatcgt tcagccatca tgaatccgtg tttctgtggc tacctagttt
241 tgttgtcttt ttttttttc ttcgcagtcg tttagactcc cagctgcaca acttgattgc
301 cttgctaatg acctgcttca gggatgcgga aattcctaat ttcttctgtg acccttctca
361 actcccccat cttgcatgtt gtgacacctt caccaataac ataatcatgt tatttccctg
421 ctgccatatt tggtttcctt cccatctcgg ggacccttt ctctttctgt aaaattgttt
481 cctccgttct gagggtttca tcgtcaggta ggaagtataa agccttctcc acctgtgggt
541 ctcacctgtc agttgtttgc tgagtttatg gaagaggcgt tggagggtac gtcagttcag
601 atgtgtcttc ttcccccaga aagggtgcag tggcctcagt gatgtacatg atggtcaccc
661 cc (SEQ ID NO:41).

OR30

LOCUS AF127843 662 bp DNA PRI 28-FEB-2000
DEFINITION Gorilla gorilla GGO1 pseudogene, partial sequence.
ACCESSION AF127843
KEYWORDS .
SOURCE gorilla.
ORGANISM Gorilla gorilla
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Gorilla.
REFERENCE 1 (bases 1 to 662)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 662)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..662
/organism="Gorilla gorilla"
/db_xref="taxon:9593"
gene <1..>662
/gene="GGO1"
/pseudo
BASE COUNT 127 a 180 c 135 g 220 t
ORIGIN
1 cttgactgac atcggtttca cctccaccac agtccccaag atgattgtgg acatccagtc
61 tcacagcaga gccatctcct atgcacgctg cctgactcag atgtctctct ttgccatttt
121 tggaggcatg gaagagagac atgctcctga gtgtgatggc ctatgaccgg tttgtagcca
181 tctgtcaccc tctgtatcgt ccagccatct tgaacccctg tttctgtggc ttcctagatt
241 cgttgtcctt gttttttttt ttttttctc agtcttttag actcccagct gcacaacttg
301 attgccttac aaatgacctg cttcatggat gtggaaattc ctaatttctt ctgggaacct
361 tctcaactcc cccatcttgc atgttgtgac accttcacca ggaacatcaa cctgtatttc
421 cctgctgcca tatttggttt tcttcccatc tcggggaccc ttttctctta ctataaaatt
481 gtttcctcca ttctgaaggt ttcatcaggt gggaagtata aaccttctcc gcctgtggtt
541 ctcacctgtc agttgtttac tgattttatg gaacaggcgt tggagggtac ctcggttcag
601 atgtgtcatc ttccccgaga aagggtgcag tggcctcagt gatgtacacg gtggtcaccc

661 cc (SEQ ID NO:42).

OR31

LOCUS AF127844 650 bp DNA PRI 28-FEB-2000
DEFINITION Gorilla gorilla GGO17 pseudogene, partial sequence.
ACCESSION AF127844
KEYWORDS .
SOURCE gorilla.
ORGANISM Gorilla gorilla
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Gorilla.
REFERENCE 1 (bases 1 to 650)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 650)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..650
/organism="Gorilla gorilla"
/db_xref="taxon:9593"
gene <1..>650
/gene="GGO17"
/pseudo
BASE COUNT 129 a 170 c 137 g 214 t
ORIGIN
1 ttttgctgac ctctgtttta cctccacgac tgtcccaaag atgttactga atatactgac
61 acagaacaaa ttcataacat atgcaggctg tctcggtcag atttttttt ttcacttcat
121 ttggatgcct ggacaattta ctcttgactg tgatggccta tgaccgcttc gtggccatct
181 gtcacccccc gcactatacg gtcatcatga acccccggct ctgtggactg ctggttctgg
241 ggtcctggtg catcagtgtc atgggttccc tgctcgagac cttgactgtt ttgaggctgt
301 ccttctgcac caaaatggaa attccacact ttttttgtga tcttcttgaa gtcctgaagc
361 tcgcctgttc tgacaccttc attaataacg tggtgatata ctttgcaact ggcgtcctgg
421 gtgtgattcc cttcactgga atatttttct cttactataa aattgttttc tctatactga
481 ggatttcctc agctgggaga aagcacaagg cgttttccac ctgtggttcc cacctctcag
541 tggtcacctt gttctatggc acgggctttg gggtctatct cagttctgca gccacaccat
601 cttctaggac aagtctggtg gcctcagtga tgtacaccat ggtcaccccc (SEQ ID NO:43).

OR32

LOCUS AF127845 649 bp DNA PRI 28-FEB-2000
DEFINITION Gorilla gorilla olfactory receptor (GGO18) gene, partial cds.
ACCESSION AF127845
KEYWORDS .
SOURCE gorilla.
ORGANISM Gorilla gorilla
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Gorilla.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..649
/organism="Gorilla gorilla"
/db_xref="taxon:9593"
gene <1..>649
/gene="GGO18"
CDS <1..>649
/gene="GGO18"
/codon_start=2
/product="olfactory receptor"
/translation="FVDICFVSTTVPKMLVNIQTHNKVITYAGCITQMCFFLLFVGLD
NFLLTVMAYDRFVAICHPLHYMVIMNPQLCGLLVLASWIVGVLNSMLQSLMVLPLPFC
THMEIPHFFCEINQVVHLACSDTFLNDIVMYFAVALLGGGPLNGILYSYSKIVSSIRA
ISSAQGKYKAFSTCASHLSVVSLFYGTCLGVYLSSAATHNSHTGAAASVMYTVVTP" (SEQ ID NO:45).
BASE COUNT 136 a 172 c 134 g 207 t
ORIGIN
1 cttcgtagac atctgttttg tctctaccac tgtcccgaag atgctggtga acatccagac
61 acacaacaaa gtcatcacct atgcaggctg catcacccag atgtgctttt tcttactctt
121 tgtaggattg gataacttcc ttctgaccgt gatggcctat gaccggtttg tggccatctg
181 tcaccctctg cactacatgg tcattatgaa ccctcaactc tgtggactgc tggttctggc
241 gtcctggatc gtgggtgttc tgaattccat gttacaaagc ttaatggtgt tgccactgcc
301 cttttgtaca cacatggaaa tccctcattt tttctgtgaa attaatcagg tggtccacct
361 tgcctgttct gacacctttc ttaatgacat agtgatgtat tttgcagtag cactgctggg
421 cggtggtccc ctcaatggga tcctgtactc ttactctaag atagtttcct ccatacgtgc
481 aatctcatca gctcagggga agtataaggc attttccacc tgtgcatctc acctctcagt
541 tgtctcctta ttttatggta catgcttagg ggtgtacctt agttctgctg caacccacaa
601 ttcacacaca ggtgctgcag cctcagtgat gtacactgtg gtcaccccc (SEQ ID NO:44).

OR33

LOCUS AF127846 649 bp DNA PRI 28-FEB-2000
DEFINITION Gorilla gorilla olfactory receptor (GGO19) gene, partial cds.
ACCESSION AF127846
KEYWORDS .
SOURCE gorilla.
ORGANISM Gorilla gorilla
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia; Eutheria; Primates; Catarrhini; Hominidae; Gorilla.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission

JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..649
/organism="Gorilla gorilla"
/db_xref="taxon:9593"
gene <1..>649
/gene="GGO19"
CDS <1..>649
/gene="GGO19"
/codon_start=2
/product="olfactory receptor"
/translation="FVDICFISTTVPKMLVNIQARIKDISYMGCLTQVYFLMMFAGMD
TFLLAVMAYDRFVAICHPLHYTVIMNPCLCGLLVLASWFIIFWFSLVHVLLMKRLTFS
TGTEIPHFFCEPAQVLKVACSNTLLNNIVLYVATALLGVFPVAGILFSYSQIVSSLMR
TSSTKGKYKAFSTCGSHLCVVSLFYGTGLGVYLSSAVTHSSQSSSMASVMYAMVTP" (SEQ ID NO:47).
BASE COUNT 118 a 189 c 144 g 198 t
ORIGIN
1 ctttgtggac atctgtttca tctccaccac agtccccaag atgctagtga acatccaggc
61 acggatcaaa gacatctcct acatggggtg cctcactcag gtgtattttt taatgatgtt
121 tgctggaatg gatactttcc tactggctgt gatggcctat gaccggtttg tggccatctg
181 ccacccccctg cactacacgg tcatcatgaa cccctgcctc tgtggcctcc tggttctggc
241 atcttggttc atcattttct ggttctcgct ggttcatgtt ctactgatga agaggttgac
301 cttctccaca ggcactgaga ttccgcattt cttctgtgaa ccggctcagg tcctcaaggt
361 ggcctgctct aacaccctcc tcaataacat tgtcttgtat gtggccacgg cactgctggg
421 tgtgtttcct gtagctggga tcctcttctc ctactctcag attgtctcct ccttaatgag
481 aacgtcctcc accaagggca agtacaaagc cttttccacc tgtggatctc acctctgtgt
541 ggtctccttg ttctatggaa caggacttgg ggtctatctg agttctgctg tgacccattc
601 ttcccagagc agctccatgg cctcagtgat gtacgccatg gtcaccccc (SEQ ID NO:46).

OR34

LOCUS AF127847 649 bp DNA PRI 28-FEB-2000
DEFINITION Gorilla gorilla olfactory receptor (GGO2) gene, partial cds.
ACCESSION AF127847
KEYWORDS .
SOURCE gorilla.
ORGANISM Gorilla gorilla
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia; Eutheria; Primates; Catarrhini; Hominidae; Gorilla.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..649
/organism="Gorilla gorilla"
/db_xref="taxon:9593"

gene <1..>649
/gene="GGO2"
CDS <1..>649
/gene="GGO2"
/codon_start=2
/product="olfactory receptor"
/translation="FVDICVTSTTVPKTLSNIRTQSKVITYAGCITQMYFFILFVVLD
SLLLTVMAYDRFVAICHPLHYTVIMNSWLCGLLVLVSWIVSILCSPLQSIMALQLSFC
TELKIPHFFCELNQVVHLACSDTFIKDMMMNFTSVLLGGGCLAGIFYSYFKILCCICS
ISPAQGMNKALSTCASHLSVVSLFYCTGVGVYLSSAATHNSLSNAAASVMYTVVTS" (SEQ ID NO:49).

BASE COUNT 146 a 166 c 129 g 208 t

ORIGIN

1 ctttgtagac atctgtgtta cctccaccac agtcccaaag acactgtcaa acatccggac
61 acagagcaaa gtcatcacct atgcaggttg catcacccag atgtactttt ttatactctt
121 tgtagtgttg gacagcttac tcctgaccgt gatggcctat gaccggtttg tggccatctg
181 tcacccccctg cactacacag tcattatgaa ctcctggctc tgtggactgc tggttctggt
241 gtcctggatc gtgagcatcc tatgttctcc gttacaaagc ataatggcat tgcagctgtc
301 cttctgtaca gaattgaaaa tccctcattt tttctgtgaa cttaatcagg tcgtccacct
361 tgcctgttct gacacttttta ttaaagacat gatgatgaat tttacaagtg tgctgttggg
421 tgggggatgc ctcgctggaa tattttactc ttactttaag atactttgtt gcatatgttc
481 aatctcacca gctcagggga tgaataaagc actttccacc tgtgcatctc acctctcagt
541 tgtctcctta ttttattgta caggcgtagg tgtgtacctt agttctgctg caacccataa
601 ctcactctca aatgctgcag cctcagtgat gtacaccgtg gtcacctcc (SEQ ID NO:48).

OR35

LOCUS AF127848 649 bp DNA PRI 28-FEB-2000
DEFINITION Gorilla gorilla olfactory receptor (GGO3) gene, partial cds.
ACCESSION AF127848
KEYWORDS .
SOURCE gorilla.
ORGANISM Gorilla gorilla
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Gorilla.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..649
/organism="Gorilla gorilla"
/db_xref="taxon:9593"
gene <1..>649
/gene="GGO3"
CDS <1..>649
/gene="GGO3"
/codon_start=2
/product="olfactory receptor"

/translation="FVDTSFISTTVPKMLVNIQARIKDISYMGCLTQVYFLMMFAGMD
TFLLAVMAYDRFVAICHPLHYTVIMNPCLCGLLVLASWFIIFWFSLVHILLMKKLTFS
TGTEIPHFFCEPAQVLKVACSNTLLNNIVLYVATALLGVFPVAGILFSYSQIVSSLMR
TSSTEGKYKAFSTLWISLCVVSLFYGTGLGVYLSSAVTHSSQSSSMASVMYAVVTP" (SEQ ID NO:51).

BASE COUNT 117 a 194 c 143 g 195 t

ORIGIN

1 ctttgtggac acctctttca tctccaccac agtccccaag atgctagtga acatccaggc
61 acggatcaaa gacatctcct acatggggtg cctcactcag gtgtattttt taatgatgtt
121 tgctggaatg gatactttcc tactggccgt gatggcctat gaccggtttg tggccatctg
181 ccacccccctg cactacacgg tcatcatgaa cccctgcctc tgtggcctcc tggttctggc
241 atcttggttc atcattttct ggttctccct ggttcatatt ctactgatga agaagttgac
301 cttctccaca ggcactgaga ttccgcattt cttctgtgaa ccggctcagg tcctcaaggt
361 ggcctgctct aacaccctcc tcaataacat tgtcttgtat gtggccacgg cactgctggg
421 tgtgtttcct gtagctggga tcctcttctc ctactctcag attgtctcct ccttaatgag
481 aacgtcctcc accgagggca agtacaaagc cttttccacg ctgtggatct ccctctgtgt
541 ggtctccttg ttctatggaa caggacttgg ggtctatctg agttctgctg tgacccactc
601 ttcccagagc agctccatgg cctcagtgat gtacgccgtg gtcaccccc (SEQ ID NO:50).

OR36

LOCUS AF127849 650 bp DNA PRI 28-FEB-2000
DEFINITION Gorilla gorilla GGO4 pseudogene, partial sequence.
ACCESSION AF127849
KEYWORDS .
SOURCE gorilla.
ORGANISM Gorilla gorilla
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Gorilla.
REFERENCE 1 (bases 1 to 650)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 650)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..650
/organism="Gorilla gorilla"
/db_xref="taxon:9593"
gene <1..>650
/gene="GGO4"
/pseudo
BASE COUNT 134 a 164 c 132 g 220 t
ORIGIN

1 cttggctgag attggtttca tctcggtcgc ggttcccaag atgatcgtgg acatgcagtc
61 acatagcaga gtcatctcct atgcgggccg cctgacacag atgtctttct ttgtcctttt
121 tgcatgtatg gatgacatgc tccggactct gatggcctat gaccgatttg tggccatctg
181 tcacccccctg cactacccag tcatcatgaa tcctcacctc tgtgtcttct tagttttttgt
241 gccttttttc cttagcctgt tggattccca gctgcacagc tggattgtgt tacaattcac
301 ttgcttcaag aatgtggaaa tatctaattt tttatgtgat ccatctcaac ttctcaaact
361 tgactgttct gaacagtgtc atcaatagca tattcacata tttagatagt actatgtttg

421 gtttccttcc catttcaggg atccttttgt cttactataa aattgtcccc tccattctaa
481 gaattccatc gtcagatggg aagtataaag ccctctccac ctgtggctct cacctgtcag
541 ttgtttgctt attttatgga ataggcattg gcgtgtacct gacttcagct gtgtcaccac
601 cacccaggaa tggtgtggtg gcatcagtga tctacgcggt ggtcaccccc (SEQ ID NO:52).

OR37

LOCUS AF127850 650 bp DNA PRI 28-FEB-2000
DEFINITION Gorilla gorilla GGO70 pseudogene, partial sequence.
ACCESSION AF127850
KEYWORDS .
SOURCE gorilla.
ORGANISM Gorilla gorilla
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Gorilla.
REFERENCE 1 (bases 1 to 650)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 650)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..650
/organism="Gorilla gorilla"
/db_xref="taxon:9593"
gene <1..>650
/gene="GGO70"
/pseudo
BASE COUNT 128 a 170 c 134 g 218 t
ORIGIN
1 cttgcctgac atcggtttca cctccaccat ggtccccaag atgattgtgg acgtccaatc
61 tcacagcagg ttcatctcct atgcaggctg cctgactcag atatctctct ttgccatttt
121 tggaggcatg gaagagagac atgctcctga gtgtgatggc ctatgaccgg tttgtagcca
181 tctgtcaccc tctatatcat tcagccatca tgaacccgtg tttctgtggc ttcctagatt
241 tgctgtcttt ttttttcttc tttttctcag tcttttagat ggtcagctgc agaacttgat
301 tgccttacaa atgacctgct tcgaggatgt gggaattcct aatttcctct gtgacccttc
361 tcaactgccc catctcacat gttgtgacat cttcaccaat cacataatca tgtatttccc
421 tgctgccata tttggttttc ttcccatctc ggggaccctt ctctcttacc atgtaattgt
481 ttcctccatt ctgagggttt catcatctat gggaggtgta aagccttccc cacctgtgag
541 ttgtttgctg atattatgga acaggcttcg gagggtacct cagttcagat gtgttatctt
601 caacaagaaa ggctgcagtg gcctcagtga tgtacacggt ggtcacgccc (SEQ ID NO:53).

OR38

LOCUS AF127851 649 bp DNA PRI 28-FEB-2000
DEFINITION Gorilla gorilla olfactory receptor (GGO71) gene, partial cds.
ACCESSION AF127851
KEYWORDS .
SOURCE gorilla.
ORGANISM Gorilla gorilla
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Catarrhini; Hominidae; Gorilla.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..649
/organism="Gorilla gorilla"
/db_xref="taxon:9593"
gene <1..>649
/gene="GGO71"
CDS <1..>649
/gene="GGO71"
/codon_start=2
/product="olfactory receptor"
/translation="FADLCFTSTTVPKMLLNILTQNKFITYAGCLGQIFFFTSFGCLD
NLLLTVMAYDRFVAICHPLHYTVIMNPRLCGLLVLGSWCISVMGSLLETLTVLRLSFC
TKMEIPHFFCDLLEVLKLACSDTFINNVVIYFATGVLGVIPFTGIFFSYYKIVFSILR
ISSAGRKHKAFSTCGSHLSVVTLFYGTGFGVYLSSAATPSSRTSLAASVMYTMVTP" (SEQ ID NO:55).
BASE COUNT 130 a 171 c 136 g 212 t
ORIGIN
1 ttttgctgac ctctgtttta cctccacgac tgtcccaaag atgttactga atatactgac
61 acagaacaaa ttcataacat atgcaggctg tctcggtcag attttttttt tcacttcatt
121 tggatgcctg gacaatttac tcttgactgt gatggcctat gaccgcttcg tggccatctg
181 tcacccccctg cactatacgg tcatcatgaa ccccccggctc tgtggactgc tggttctggg
241 gtcctggtgc atcagtgtca tgggttccct gctcgagacc ttgactgttt tgaggctgtc
301 cttctgcacc aaaatggaaa ttccacactt tttttgtgat cttcttgaag tcctgaagct
361 cgcctgttct gacaccttca ttaataacgt ggtgatatac tttgcaactg gcgtcctggg
421 tgtgattccc ttcactggaa tatttttctc ttactataaa attgttttct ctatactgag
481 gatttcctca gctgggagaa agcacaaagc gttttccacc tgtggttccc acctctcagt
541 ggtcaccttg ttctatggca cgggctttgg ggtctatctc agttctgcag ccacaccatc
601 ttctaggaca agtctggcgg cctcagtgat gtacaccatg gtcaccccc (SEQ ID NO:54)

OR39

LOCUS AF127852 649 bp DNA PRI 28-FEB-2000
DEFINITION Eulemur fulvus olfactory receptor (EFU35) gene, partial cds.
ACCESSION AF127852
KEYWORDS .
SOURCE Eulemur fulvus.
ORGANISM Eulemur fulvus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia; Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for reduction of function in primates
JOURNAL Unpublished

REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..649
/organism="Eulemur fulvus"
/db_xref="taxon:13515"
gene <1..>649
/gene="EFU35"
CDS <1..>649
/gene="EFU35"
/codon_start=2
/product="olfactory receptor"
/translation="LTDICLSTATVPKMLANIRTRSQSITYAACLTQMCFVLGSATLE
NFLLAVMAYDRYVAICHPLRYAVIMNLRLCGFLILLSLSISIMDTLLHDLMVLRLSFC
THLEIPLFFCEVVQVIKLACSDTLINNLLIYFAAGVLGGVPLSGIIFSYTQIASSVLR
MASASGKYKAFSTCGSHLSVVSLLYGTGLGVYISSAFMHSPRTMAVASMMYTVVTP" (SEQ ID NO:57).
BASE COUNT 123 a 176 c 148 g 202 t
ORIGIN
1 cctcactgac atctgtttaa gcacagccac cgtcccaaag atgctggcaa acatccgaac
61 acggagtcag agcatcacgt atgcagcctg cctcacccag atgtgctttg ttctgggttc
121 tgctacgttg gaaaattttc tcctggcagt aatggcttat gaccgctatg tggccatctg
181 tcatcctctg agatacgcgg tcatcatgaa ccttcgtctc tgtggcttct tgatcctttt
241 gtccctgtct attagcatca tggacaccct gctccacgat ctgatggtct tgcggctgtc
301 cttctgcaca cacctggaga tacccctctt cttctgcgag gttgtgcaag tcatcaagct
361 tgcctgttct gataccctca tcaataacct cttgatatat tttgcagctg gcgtgttggg
421 aggtgttcct ctgtctggga tcatttttctc ttatactcag attgcctcct ctgttttgag
481 aatggcatca gcaagtggaa agtataaagc tttttccacc tgtggctctc acctctcggt
541 tgtgtccttg ctctacggga caggtttggg ggtgtacatc agttctgcgt ttatgcactc
601 tcccaggacg atggcagtgg cttcaatgat gtacacggtg gtcactccc (SEQ ID NO:56).

OR40

LOCUS AF127853 645 bp DNA PRI 28-FEB-2000
DEFINITION Eulemur fulvus EFU36 pseudogene, partial sequence.
ACCESSION AF127853
KEYWORDS .
SOURCE Eulemur fulvus.
ORGANISM Eulemur fulvus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia; Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.
REFERENCE 1 (bases 1 to 645)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 645)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers

source 1..645
/organism="Eulemur fulvus"
/db_xref="taxon:13515"
gene <1..>645
/gene="EFU36"
/pseudo
BASE COUNT 118 a 189 c 138 g 200 t
ORIGIN
1 ctttgctgac gtctgtttca cctccaccac ggtgcccaag atgttagtga acatccaggc
61 gcacagcaag gccatcacat acaaaggctg cctcacccag atgtgttttt tcttgatttt
121 tggtgggcta gtttgctact gacggtgatg gcctatgacc ggttcgtggc catctgtcac
181 cccctgcgct acatggtcat catgaacccc aggctctgtg gtcttctgct tctcctttct
241 tggttgatct gcttgacgta ttctctgctg caaagtctga tggttttgag ggtgtccttc
301 tgccaagaaa tagaaatccc ccactacttc tgtgaacttg ctcagatcct cacgctcgcc
361 tgctctgaca ccctagttaa tgacgtcctg ctgtattttc tatctgctct gctcggtgtt
421 attcccctga ctgggatcct ttattcttat tccagaatta tctcctccat aatgtgcatt
481 tcctctgctg gagggaagta caaagccttt tccacctgtg ggtctcacct ctccgtcgtc
541 tccttgttct acggtacagg ccttggggtc tacctaactt ctgaaacagc ccagccctcc
601 agaaggggtt caatagcctc ggtgatgtac accatggtca ccccc (SEQ ID NO:58).

OR41

LOCUS AF127854 647 bp DNA PRI 28-FEB-2000
DEFINITION Eulemur fulvus EFU37 pseudogene, partial sequence.
ACCESSION AF127854
KEYWORDS .
SOURCE Eulemur fulvus.
ORGANISM Eulemur fulvus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.
REFERENCE 1 (bases 1 to 647)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 647)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..647
/organism="Eulemur fulvus"
/db_xref="taxon:13515"
gene <1..>647
/gene="EFU37"
/pseudo
BASE COUNT 118 a 192 c 141 g 196 t
ORIGIN
1 ctttgttgac atctgtttca cctccaccac catccccaag atgactgtgg acatcctaac
61 tcacagcaga gtcatctcct ctgggggctg tctgacccag atgtctcttg ctctgctttt
121 tgtttgtgtg gatgatatgc ttctgaccgt gtcggcctgt gacctgtttg tggccatctg
181 ccacccccctg cactacacgg tcatcatgaa cccccacttc tgtggcctcc tggttctgat
241 atcttggttc atcatgtccc tggttgtcct ggttcacctc ctactgataa ggaggctgac
301 attccccagg gccacagaaa tcccacatta cttctgtgaa ctggctcaaa ttctcaaagt

361 ggcccactct gacagcttca tcaataacat ctccttgtac ttgtcggctg tgttgctggg
421 tgtgtttccc atcacaggga tcctctactc ctactctaaa attgtctcct ccgtaatgag
481 gatgtcgtcc actgcaggca agaagaaagc attttccacc tgtgggtctc atttgtgtgg
541 tctgcttgtt ctatggaaca gggcttgggg tctacctcag ctctgctgtg acccccttctt
601 cccagagcag cagcattgcc tcagtgatgt actcggtggt caccccc (SEQ ID NO:59).

OR42

LOCUS AF127855 652 bp DNA PRI 28-FEB-2000
DEFINITION Eulemur rubriventer ERU38 pseudogene, partial sequence.
ACCESSION AF127855
KEYWORDS .
SOURCE Eulemur rubriventer.
ORGANISM Eulemur rubriventer
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.
REFERENCE 1 (bases 1 to 652)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 652)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..652
/organism="Eulemur rubriventer"
/db_xref="taxon:34829"
gene <1..>652
/gene="ERU38"
/pseudo
BASE COUNT 124 a 191 c 136 g 201 t
ORIGIN
1 ctttgttgac atctgtttca cctccaccac catccccaag atgctggtga acattgacac
61 acacagcaaa gacatctcct acgtgggatg cctcactcag atgtattttt tcatggtgtt
121 tggtggactg gacaacttcc tcctgaccgt gatggcctgt gaccggtttg tggccatctg
181 tcacccccctg cactatgcag tacagtcatc atgaaccccc gcttctgtgc cctcctggtt
241 ctgatgtctt ggttcatcat gtccctggat gccctggttc atgttctact tatactgagg
301 ctgacctttt ccttagaaac tgaaatccca catttcttct gtgacctggc tcagatgctc
361 gaggtggccc gctctgacac ctttatcaat aacatctgct tgtacttgtt ggctgtgttg
421 ctgtatgttt cctgtcacgg ggatcctcta cccctactct aaaattgtct cctccttaat
481 gaggatgtcc tccactgcag gcaagaagaa agcattttcc acctgtgggt ctcacctctc
541 tgtggtcctc ttgttctatg gaacaggact tggggtctac ctaagttctg ctgtgacccc
601 ttcttcccag agcagcgcca ttgcctcagt gatgtacaca gtagtcaccc cc (SEQ ID NO:60).

OR43

LOCUS AF127856 648 bp DNA PRI 28-FEB-2000
DEFINITION Eulemur rubriventer ERU39 pseudogene, partial sequence.
ACCESSION AF127856
KEYWORDS .
SOURCE Eulemur rubriventer.
ORGANISM Eulemur rubriventer

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.
REFERENCE 1 (bases 1 to 648)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 648)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..648
/organism="Eulemur rubriventer"
/db_xref="taxon:34829"
gene <1..>648
/gene="ERU39"
/pseudo
BASE COUNT 132 a 173 c 141 g 202 t
ORIGIN
1 ctttgcagac atctgttttg tgtccaccac tgtcccagag atgctgaatg tgcagacatg
61 gagcaaagtc atatcctaca caggctgcat cacccagatg gacttttct tgctctttgt
121 aggactggac aacttcctcc tgaccgtgat ggcctgtgac cggtttgtgg ccatctgtca
181 ccccctgcac tatgcagtac agtcatcatg aaccccaggc tctgtgcatt tcttgttctg
241 gtgttctgga tcctgagtgt cctgaattcc ttgttacaaa gcttaatggt gttgcagata
301 accttctgta cagacttgga aatcccccac tttttctgtg aacttaatca gataatccac
361 cttgcctgtt tggacacctt tcttaatgac atggtgatgt atttggcagt gatgctgctg
421 ggtgggggggt gccttactgg gatcctttac tcttactcta agatagtttc ctccgtacgt
481 gcaatctcct cggctcaggg gaagtataaa gcattttcca cctgtgcatc tcacctctcg
541 gtcgtctcct tattttattg tacatgccta ggggtgtacc tcagttctgc tacacacaac
601 tcacactcca gcgcaacagc ctcggtgatg tacacggtgg tcactccc (SEQ ID NO:61).

OR44

LOCUS AF127857 649 bp DNA PRI 28-FEB-2000
DEFINITION Eulemur rubriventer olfactory receptor (ERU40) gene, partial cds.
ACCESSION AF127857
KEYWORDS .
SOURCE Eulemur rubriventer.
ORGANISM Eulemur rubriventer
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..649

/organism="Eulemur rubriventer"
/db_xref="taxon:34829"
gene <1..>649
/gene="ERU40"
CDS <1..>649
/gene="ERU40"
/codon_start=2
/product="olfactory receptor"
/translation="LSDICFTSTTIPKMLVNLHAHSKDISYRECLTQVYFFMIFAGLD
NFLLTVMAYDRFVAICHPLHYMVIMNPRFCALLVLMSWFIMSLVALVHVLLILRLTFS
LETEIPHFSCEVAQILKVARSDTFFNNICLYLSAVLLGVFPVMGILFSYSKIVSSLMR
MSSTSAKNKAFSTCGSHLCVVSLFYGTALGVYLSSAVTPSSQSSAIASVMYTVVTP" (SEQ ID NO:63).
BASE COUNT 119 a 187 c 131 g 212 t
ORIGIN
1 cctttctgac atctgtttca cctctaccac catcccaaag atgctggtga accttcacgc
61 acacagcaaa gacatctcct acagggagtg cctcactcag gtgtattttt ttatgatttt
121 tgctggactg gataatttcc tcctgaccgt gatggcctat gaccggtttg tggccatctg
181 ccacccccctg cactacatgg tcatcatgaa tccccgcttc tgtgccctcc tggttctcat
241 gtcttggttc atcatgtctc tggttgccct ggttcatgtt ctacttatat tgaggctgac
301 tttttcctta gaaactgaaa tcccacattt ctcctgtgag gtggctcaga ttctcaaggt
361 ggcccgctct gacaccttct tcaataacat ctgcttatac ttgtcggctg tgttgctggg
421 tgtgtttccc gtcatgggga tcctcttctc ctactctaaa attgtttcat ccttaatgag
481 gatgtcctcc acttcagcaa agaataaagc attttccacc tgtgggtctc acctctgtgt
541 ggtctctttg ttctatggaa ctgcacttgg ggtctacctc agctctgctg tgaccccttc
601 ttcccagagc agcgccattg cctcagtgat gtacacggtg gtcaccccc (SEQ ID NO:62).

OR45

LOCUS AF127858 648 bp DNA PRI 28-FEB-2000
DEFINITION Eulemur fulvus EFU56 pseudogene, partial sequence.
ACCESSION AF127858
KEYWORDS .
SOURCE Eulemur fulvus.
ORGANISM Eulemur fulvus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.
REFERENCE 1 (bases 1 to 648)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 648)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..648
/organism="Eulemur fulvus"
/db_xref="taxon:13515"
gene <1..>648
/gene="EFU56"
/pseudo
BASE COUNT 131 a 180 c 142 g 195 t

ORIGIN
1 ctttgtagac atctatattg tctctaccac ggtcccaaag atgctggtga atatcaagac
61 acacagcaaa gccatatcct acgcaggctg tgtcacccag atgcactttt gcataacgtt
121 tgcagagtag gcatcttcct cctgactgtg atggcctatg actggtttgg ggccatctgt
181 cacccccctgc actatgtgct catcatgaac cccaggctct gtgcactgct tgttctggtg
241 tcctggatca tgagtgtcct gaattccttg ttgcaaagct taatggtgtt gccactgccc
301 ttctgtgcag agttggaaat cccccagttt ttctgtgaac ttaatcagat aatcctcctt
361 gcctgttctg acacctttct taatgacgtg gtgatgtatt tggcagctat gctactgggt
421 gaggggtgcc ttactgggat cctttactct tactctaaga tagtttcctc cgtacgtgca
481 atctcctcgg ctcaggggaa gtataaagca ttttccacct gtgcatctca cctctcggtc
541 gtctccttat tttactgcac aagcctcggg gtgtacctcg gctctgctgc tacacacaac
601 tcacactcca gcgcaacagc ctcggtgatg tacacggtgg tcactccc (SEQ ID NO:64).

OR46

LOCUS AF127859 643 bp DNA PRI 28-FEB-2000
DEFINITION Eulemur fulvus olfactory receptor (EFU57) gene, partial cds.
ACCESSION AF127859
KEYWORDS .
SOURCE Eulemur fulvus.
ORGANISM Eulemur fulvus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.
REFERENCE 1 (bases 1 to 643)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 643)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..643
/organism="Eulemur fulvus"
/db_xref="taxon:13515"
gene <1..>643
/gene="EFU57"
CDS <1..>643
/gene="EFU57"
/codon_start=2
/product="olfactory receptor"
/translation="FADICFVSTTVPEMLNVQTWSKVISYTGCITQMDFFLLFVGLDN
FLLTVMAYDRFVAICHPLRYAVIMNPRLCVFLVLVSWILSVLNSLSQSLMVLRLTFCT
DLEIPHFFCELNQIIHLACSDTFLNDVVMYLAVMLLGGGCLTGILYSYSKIVSSVRAI
SSAQGKCKAFSTCASHLLVVSLFYCTCLGVYLSSATHNSHSSATASVMYTVVTP" (SEQ ID NO:66).
BASE COUNT 127 a 171 c 143 g 202 t
ORIGIN
1 ctttgcagac atctgttttg tgtccaccac tgtcccagag atgctgaatg tgcagacatg
61 gagcaaagtc atatcttaca caggctgcat cacccagatg gacttttttct tgctctttgt
121 aggactggac aacttcctcc tgaccgtgat ggcctatgac cggtttgtgg ccatctgtca
181 ccccctgcgc tatgcagtca tcatgaaccc caggctctgt gtatttcttg ttctggtgtc
241 ctggatcctg agtgtcctga attccttgtc acaaagctta atggtgttgc ggctaacctt

301 ctgtacagac ttggaaatcc cccacttttt ctgtgaactt aatcagataa tccaccttgc
361 ctgttcggac acctttctta atgacgtggt gatgtatttg gcagtgatgc tgctgggtgg
421 gggatgcctt actgggatcc tttactctta ctctaagata gtttcctccg tacgtgcaat
481 ctcctcggct caggggaagt gtaaagcatt ttccacctgt gcatctcacc tcttggtcgt
541 ctccttattt tattgtacat gcctaggggt gtacttgagt tctgctacac acaactcaca
601 ctccagcgca acagcctcgg tgatgtacac ggtggtcact ccc (SEQ ID NO:65).

OR47

LOCUS AF127860 644 bp DNA PRI 28-FEB-2000
DEFINITION Eulemur rubriventer ERU66 pseudogene, partial sequence.
ACCESSION AF127860
KEYWORDS .
SOURCE Eulemur rubriventer.
ORGANISM Eulemur rubriventer
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.
REFERENCE 1 (bases 1 to 644)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 644)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..644
/organism="Eulemur rubriventer"
/db_xref="taxon:34829"
gene <1..>644
/gene="ERU66"
/pseudo
BASE COUNT 113 a 191 c 145 g 195 t
ORIGIN
1 cttttctgac atctgtttca cttccgccac catcccaaag atgctgtgga gcatccgggc
61 acagagcaaa tccatcaccg gtgccggctg cctcacacag atgtactgtt tcatggcttt
121 tggacttctg gacaatctga tgctgatggt catggcttat gaccactttg tggccatctg
181 tcaccctctg cactacacag tcatcatgaa cccagtgctc tgtgtccagg tgcttgtcca
241 caccgggctt gtcagcatcc tgggggcctt cctcggagag tgaccgtgtt gcggcttctt
301 ttggtgcagt cactgaaatc ccacactatt tctgtgagct ccctgaggct ctccagctct
361 cccactctga cccctccatc aataatgtca tattatacat tgtgacggtg tcatgggctt
421 ctttcctctt gctgagattc ttttctctta ttctccaact gttttttctg tcctgaggat
481 ctcaacagca ggggggaagt ataaagtgtt ttcctcctgt gagtctcacc tctcggttgt
541 ctgcctgttc tgtgggacct gcctggggtc tagctcagtt ccacatggac acacgcttct
601 ccgacagggg tgttgcctcg gtcccataca ctgtagtcac cccc (SEQ ID NO:67).

OR48

LOCUS AF127861 649 bp DNA PRI 28-FEB-2000
DEFINITION Eulemur rubriventer olfactory receptor (ERU67) gene, partial cds.
ACCESSION AF127861
KEYWORDS .
SOURCE Eulemur rubriventer.

ORGANISM Eulemur rubriventer
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..649
/organism="Eulemur rubriventer"
/db_xref="taxon:34829"
gene <1..>649
/gene="ERU67"
CDS <1..>649
/gene="ERU67"
/codon_start=2
/product="olfactory receptor"
/translation="FMDICFTTVIVPKMLVNFLSETKAISYVGCLVQMYFFMALANTD
SYLLASMAIDRLVAICKPFHYDVVMSPRRCLLMLLGSCTISHLHSLFRVLLMSRLSFC
ASHIIKHFFCDTQPVLKLSCSDTSSSQIVVMTETLAVIVTPFLCIIFSYLRIIITVLA
IPSAAGKWKAFSTCGSHLTVVVLFYGSVIYVYFRPLSMYSVMKDRVATVMYTVVTP" (SEQ
ID NO:69).
BASE COUNT 119 a 200 c 141 g 189 t
ORIGIN
1 tttcatggat atctgcttca caacagtcat tgtgcccaag atgctggtga atttcctgtc
61 agagacaaag gccatctcct atgtgggctg tctggtccag atgtacttct tcatggccct
121 tgcaaacact gacagctacc tactggcctc catggctatt gaccggctgg tggccatctg
181 caaacccttc cactatgatg tggttatgag cccacggcgt tgcctcctca tgctgttggg
241 ttcttgcacc atctcccacc tacactccct gttccgggtg ctactcatgt ctcgcctgtc
301 tttctgtgcc tcccacatca ttaagcactt tttctgtgat acccagcctg tgctaaagct
361 ttcctgctct gacacatcct ccagccagat tgtggtcatg accgagaccc tggctgtcat
421 cgtgaccccc ttcctgtgca tcatcttctc ctatctgaga atcatcatca ctgtgctcgc
481 aatcccctct gcagccggga agtggaaggc cttctccacc tgtggctccc acctcactgt
541 ggtggtcctg ttctatggca gtgtcatcta tgtgtatttc aggcccctgt ccatgtactc
601 agtgatgaag gaccgggtag ccacagttat gtacacggta gtgacacct (SEQ ID NO:68).

OR49

LOCUS AF127862 649 bp DNA PRI 28-FEB-2000
DEFINITION Eulemur fulvus olfactory receptor (EFU83) gene, partial cds.
ACCESSION AF127862
KEYWORDS .
SOURCE Eulemur fulvus.
ORGANISM Eulemur fulvus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for

reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..649
/organism="Eulemur fulvus"
/db_xref="taxon:13515"
gene <1..>649
/gene="EFU83"
CDS <1..>649
/gene="EFU83"
/codon_start=2
/product="olfactory receptor"
/translation="FSDICLVSTTVPQMLVNVQTHSKVISYAGCVTQMDFFVLFVGLD
SFLLTVMAYDRFVVICHPLHYAVTMNPRLCGLLVLLSWIMSALSSLLESLVVLWVCFC
LDLEIPHFFCELNEIIHLACSDTFLIDMVMYFSALLLGGGSLAGILYSYSKIVSSVRA
ISSAQGKYKAFSTCASHLAVVSLFYCTSLGVYLSSAATHNSHSSATASVMYTVVTP" (SEQ ID NO:71).
BASE COUNT 119 a 182 c 152 g 196 t
ORIGIN
1 cttttctgac atctgcttgg tctcgaccac tgtcccacag atgctggtga atgtgcagac
61 acacagcaaa gtcatatcct acgcaggctg cgtcacccag atggacttct ttgtactctt
121 tgtagggctg gacagcttcc tccttaccgt gatggcctat gaccggtttg tggtcatctg
181 ccacccactg cactacgcgg tcaccatgaa ccccaggctc tgtgggctgc tggtgctgct
241 gtcttggatc atgagtgccc tgagttcctt gttagaaagc ttagtggtgc tgtgggtgtg
301 cttctgtctg gacttggaaa tcccccactt tttctgtgaa cttaatgaga taatccacct
361 ggcctgttct gacacctttc ttattgacat ggtgatgtat ttctcagctc tactgctggg
421 tggtggttcc ctggctggga tcctttactc ttactctaag atagtttcct ccgtacgtgc
481 aatctcctca gctcagggga agtataaagc attttccacc tgtgcatctc acctcgcggt
541 tgtctcccta ttttactgca caagcctcgg ggtgtacttg agttctgctg ctacacacaa
601 ctcacactcc agcgcaacag cctcggtgat gtacacggtg gtcactccc (SEQ ID NO:70).

OR50

LOCUS AF127863 642 bp DNA PRI 28-FEB-2000
DEFINITION Eulemur rubriventer EFU84 pseudogene, partial sequence.
ACCESSION AF127863
KEYWORDS .
SOURCE Eulemur rubriventer.
ORGANISM Eulemur rubriventer
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia; Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.
REFERENCE 1 (bases 1 to 642)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 642)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,

Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..642
/organism="Eulemur rubriventer"
/db_xref="taxon:34829"
gene <1..>642
/gene="EFU84"
/pseudo
BASE COUNT 130 a 180 c 138 g 194 t
ORIGIN
1 ctttgtagac atctgttttg tctctaccat ggtcccaaag atgctggtga acatcaagac
61 acacagcagt catatcctat gcaggctgtg tcacccagat gcacttttcc ataatctttg
121 cagagttaga catcttcctc ctgacggtga tggcctatga ccggtgtgtg gccatctgtc
181 acccccctgca ctacacggcc atcatgaacc ccaggctctg tgaactgctg gttctggctt
241 cctggatcat aagtggcccg aattccttgt tacaaagtgt aaaggtgctg tggctgtcct
301 tctgtacaaa cttggaaatc cgtcactttt tctgtgaact tagatactac atcttgcctg
361 ttgtgacacc tctgttcatg acgtggtgat acatattgca gctgtggtgc tggctgtttt
421 tcctcttgct gggatccttt actcttactc tcagatagtt tcctccacac gtgcactctc
481 ctcagctcag gcgaagtgta aagcattttc cacctgtgca gctcacctcg cggttgtctc
541 tctattttac tgcacaagcc tcggggtgta cttgagctct gctgctacac acaacccaca
601 ctccagcgca acagcctcgg tgatgtacat ggtggtcact cc (SEQ ID NO:72).

OR51

LOCUS AF127864 652 bp DNA PRI 28-FEB-2000
DEFINITION Eulemur fulvus EFU86 pseudogene, partial sequence.
ACCESSION AF127864
KEYWORDS .
SOURCE Eulemur fulvus.
ORGANISM Eulemur fulvus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.
REFERENCE 1 (bases 1 to 652)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 652)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..652
/organism="Eulemur fulvus"
/db_xref="taxon:13515"
gene <1..>652
/gene="EFU86"
/pseudo
BASE COUNT 126 a 166 c 152 g 208 t
ORIGIN
1 ctttgcagac atctgttttg gttccaccac tgtcccaaag atgctggtga atgtgcagac
61 acagagcaaa gtcatatcct acgcaggctg cgtcacccag atggactttt tcatactctt
121 tgcagggttg gatatcttta tgctgatcat gatggcctat gaccggtttg gggccatctg
181 tcacccactg cagtacacgg tcatcatgaa ccccaggctc tgtgggctgc tggttgtggt

241 gccctggatc ttgagtgacc tgaattcctt gttacaaagc ttaatggtgt tgtcactgtc
301 cttttgtaga cacttggaaa tcctcacttt ttctgtgaac ttaatcaggt tgtccacctt
361 gcctgttctg aaaccttctt taatgacatg gtgatgtatc tgatatctgt ggtgctgggt
421 ggtggttccc tggctgggac tctttattct ttcttactgc agaatagttt gctccatacg
481 tgcaacgtcc tcagctcagg ggaagtataa agcatttccc acctgtgcat ctcacctctc
541 agttgtctcc ttatcttcct gcacaatcct aggggtgtac ctcagctctg ctgctaccca
601 gaattcgtgc tccagtgcag tagccttggt ggtgtacacg gtggtcactc cc (SEQ ID NO:73).

OR52

LOCUS AF127865 649 bp DNA PRI 28-FEB-2000
DEFINITION Eulemur fulvus olfactory receptor (EFU87) gene, partial cds.
ACCESSION AF127865
KEYWORDS .
SOURCE Eulemur fulvus.
ORGANISM Eulemur fulvus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..649
/organism="Eulemur fulvus"
/db_xref="taxon:13515"
gene <1..>649
/gene="EFU87"
CDS <1..>649
/gene="EFU87"
/codon_start=2
/product="olfactory receptor"
/translation="FVDICFTSTTIPKMLVNIETHSKDISYMGCLTQMYFFMIFAGLD
NFLLTVMAYDRFVAICHPLHYTVIMSPRFCALLVLISWFIMTLVALVHVLLILRLTFS
LETEIPHFFCDLAQILEVAHSDTLINNICMYLSTVLLGVFPVTGILFSYSKIVSSLMR
MSSTAGKKKAFSTCGSHLSVVCLFCGTGVGVYLSSAVTPSSQSSSIASVMFTVVTP" (SEQ ID NO:75).
BASE COUNT 125 a 187 c 134 g 203 t
ORIGIN
1 ctttgttgac atctgtttca cctccaccac catccccaag atgctggtga acattgaaac
61 acacagcaaa gacatctcct acatgggatg cctcactcag atgtattttt tcatgatttt
121 tgctggactg gataatttcc tcctgactgt gatggcctat gaccggtttg tggccatctg
181 ccacccctta cactacacgg tcatcatgag tccccgcttc tgtgccctcc tggttctcat
241 atcttggttc atcatgaccc tggttgccct ggttcatgta ctactgatat tgaggctgac
301 cttctcttta gaaactgaaa tcccacattt cttctgtgac ctggctcaga ttctcgaggt
361 ggcccactct gataccctca tcaataacat ctgcatgtac ttgtcgactg tgttgctggg
421 cgtgtttcct gtcacgggga tcctcttctc ctactctaaa attgtctcct ccttaatgag
481 gatgtcctcc actgcaggca agaagaaagc attttccacc tgtgggtctc acctctctgt
541 ggtctgcttg ttctgcggaa caggagttgg ggtctatctc agttctgctg tgaccccttc

601 ttcccagagc agcagcattg cctcagtgat gttcacggtg gtcaccccc (SEQ ID NO:74).

OR53

LOCUS AF127866 646 bp DNA PRI 28-FEB-2000
DEFINITION Macaca sylvanus MSY1 pseudogene, partial sequence.
ACCESSION AF127866
KEYWORDS .
SOURCE Barbary ape.
ORGANISM Macaca sylvanus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Macaca.
REFERENCE 1 (bases 1 to 646)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 646)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..646
/organism="Macaca sylvanus"
/db_xref="taxon:9546"
gene <1..>646
/gene="MSY1"
/pseudo
BASE COUNT 115 a 186 c 144 g 201 t
ORIGIN
1 ctttgttgac atctgtttta tctccaccac cgtccccagg atgctgatga acatccaggc
61 atggagcaaa gacatctcct acgtggggtg cctcactcag gtgtattttt taatgatgtt
121 tgctggaatg gatactttcc tactggccat gatggcctat gaccggtttg tggccatctg
181 ccacccccctg cactacacgg tcatcatgaa cccctgcctc tgtggcctcc tggttctggc
241 atcttgattc atcattttat gggtctccct agttcatatt ctactgatga agagtttgat
301 ctccataggc actgagattc cgcatttctt ctgtgaactg gctcaggtcc tcaaggtggc
361 ccgctctgat actctcctcg ttaacattgt cttgtatgtg gccacagcac tgctgggtgt
421 gcttcctgta gctgggatcc tcttctccta ctctcagatc gtctcctcct taatgaggat
481 gtcctccacc gagggcaagt gcaaagcctt ttccacctgt gggtctcacc tctgtgtggt
541 ctccttgttc tatggaacag gacttggggt ctatctcagt tctgctgtga cccattcttc
601 ccagagcagc tccatggcct cagtgatgta caccatggtc accccc (SEQ ID NO:76).

OR54

LOCUS AF127867 649 bp DNA PRI 28-FEB-2000
DEFINITION Macaca sylvanus olfactory receptor (MSY12) gene, partial cds.
ACCESSION AF127867
KEYWORDS .
SOURCE Barbary ape.
ORGANISM Macaca sylvanus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Macaca.

REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..649
/organism="Macaca sylvanus"
/db_xref="taxon:9546"
gene <1..>649
/gene="MSY12"
CDS <1..>649
/gene="MSY12"
/codon_start=2
/product="olfactory receptor"
/translation="FVDVCFVSTTVPKMLVNIQTQNKVITYAGCISQMCFFIFFAGLD
IFMLTVMAYDRFVAICHPLHYTVTMNPRLCGLLVLASWIMSALNSSLQSLMVLHLSFC
ADLEIPHFFCELNQVIHLTCSDTFLNDMVMYLSAVLLGGGCLIGILYSYSKIVSSIHA
ISSVQGKYKAFSTCASHLSVVSLFYCTILGVYLSSAATHSSHASAAVSVMYTVVTP" (SEQ ID NO:78).
BASE COUNT 132 a 173 c 138 g 206 t
ORIGIN
1 cttcgtagac gtctgttttg tgtccaccac tgtcccgaag atgctggtga acatccagac
61 acagaacaaa gtcatcacct atgcaggctg catcagccag atgtgctttt tcatattctt
121 tgcaggattg gacatcttta tgctgaccgt gatggcctac gacaggtttg tggccatctg
181 tcacccccctg cactacacgg tcaccatgaa ccccaggctc tgtggactgc tggttctggc
241 gtcctggatc atgagtgccc tgaattcttc attgcaaagc ttaatggtat tgcacctttc
301 cttctgtgca gacttggaaa ttccccactt tttctgtgaa cttaatcagg tcatccacct
361 tacctgttct gacacttttc ttaatgacat ggtgatgtat ttgtcagctg tgctgctggg
421 tgggggatgt ctcattggga tcctttactc ttactctaag atcgtctcct ctatacatgc
481 aatctcatca gttcagggga agtacaaggc attttccacc tgtgcatctc acctctcggt
541 tgtctcctta ttttattgta caatcctagg tgtgtacctt agttctgctg caacccacag
601 ctcacacgca agtgctgcag tctcggtgat gtacactgtg gttaccccc (SEQ ID NO:77).

OR55

LOCUS AF127868 649 bp DNA PRI 28-FEB-2000
DEFINITION Macaca sylvanus olfactory receptor (MSY16) gene, partial cds.
ACCESSION AF127868
KEYWORDS .
SOURCE Barbary ape.
ORGANISM Macaca sylvanus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia; Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae; Macaca.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for reduction of function in primates
JOURNAL Unpublished

REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..649
/organism="Macaca sylvanus"
/db_xref="taxon:9546"
gene <1..>649
/gene="MSY16"
CDS <1..>649
/gene="MSY16"
/codon_start=2
/product="olfactory receptor"
/translation="LADIGFTSTTVPKMLVNIQAQSNAISYAGCISQMYFFMVFGGID
TFLLTVMAYDRYVAICHPLYYPVIMNPRLCGLLVLVSWFLSLSYSLIQSLLMLQLSFC
TSWVIQHFYCELAQALTLACSDTHINYILLYVVTGLLGFVPFSGILFSYTQIVSSILR
ISSTDGKHKAFSNCGSHLSVVFLFYGTGLGVYLSSNASSSSWRGMVASVMYTVVTP" (SEQ
ID NO:80).
BASE COUNT 115 a 195 c 140 g 199 t
ORIGIN
1 cttggctgac atcggtttca cctccaccac agtccccaag atgctggtga acatccaggc
61 gcagagcaat gccatcagct atgcaggctg catctcccag atgtattttt tcatggtttt
121 tggaggcata gacacatttc tcctcaccgt gatggcctat gaccggtatg tggccatctg
181 tcacccccctg tactaccctg tcattatgaa ccccgcctc tgtggcctgc tggttcttgt
241 gtcctggttc ctcagcttgt catactccct gatccagagt ctgttgatgc tgcagttgtc
301 cttttgcacc agttgggtca ttcagcactt ttactgcgag cttgctcagg ccctcacgct
361 tgcctgctca gacacacaca tcaattacat cctgctctac gtggtgaccg gccttctggg
421 ttttgtgccc ttctcaggaa tccttttctc ctacacccaa attgtctcct ccatcctgag
481 aatctcatcc acagatggga aacacaaagc cttttctaac tgcggatctc atctgtctgt
541 ggtttttta ttctatggga caggccttgg tgtgtatctt agttccaatg catcgtcctc
601 ttcctggcgg ggcatggtgg cctcggtcat gtacactgtg gtcaccccc (SEQ ID NO:79).

OR56

LOCUS AF127869 647 bp DNA PRI 28-FEB-2000
DEFINITION Macaca sylvanus MSY2 pseudogene, partial sequence.
ACCESSION AF127869
KEYWORDS .
SOURCE Barbary ape.
ORGANISM Macaca sylvanus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Macaca.
REFERENCE 1 (bases 1 to 647)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 647)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers
source 1..647
/organism="Macaca sylvanus"
/db_xref="taxon:9546"
gene <1..>647
/gene="MSY2"
/pseudo
BASE COUNT 131 a 173 c 137 g 206 t
ORIGIN
1 cttcgtagac gtctgttttg tgtccaccac tgtcccgaag atgctggtga acatccagac
61 acagaacaaa gtcatcacct atgcaggctg catcagccag atgtgctttt tcatattctt
121 tgcaggattg gacaccttta tgctgaccgt gatggcctac gacaggtttg tggccatctg
181 tcaccctctg cactacacgg tcaccatgaa ccccaggctc tgtggactgc tggttctggc
241 gtcctgatca tgagtgccct gaattcttca ttgcaaagct taatggtatt gcacctttcc
301 ttctgtgcag acttggaaat tccccacttt ttctgtgaac ttaatcaggt catccacctt
361 acctgttctg acacttttct taatgacatg gtgatgtatt tgtcagctgt gctgctgggt
421 gggggatgtc tcattgggat cctttactct tactctaaga tcgtctcctc tatacttgca
481 atctcatcag ttcaggggaa gtacaaggca ttttccacct gtgcatctca cctctcggtt
541 gtctccttat ttattgtaca atcctaggtg tgtaccttag ttctgctgca acccacagct
601 cacacgcaag tgctgcagtc tcggtgatgt acactgtggt taccccc (SEQ ID NO:81).

OR57

LOCUS AF127870 649 bp DNA PRI 28-FEB-2000
DEFINITION Macaca sylvanus olfactory receptor (MSY4) gene, partial cds.
ACCESSION AF127870
KEYWORDS .
SOURCE Barbary ape.
ORGANISM Macaca sylvanus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Macaca.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..649
/organism="Macaca sylvanus"
/db_xref="taxon:9546"
gene <1..>649
/gene="MSY4"
CDS <1..>649
/gene="MSY4"
/codon_start=2
/product="olfactory receptor"
/translation="FIDICFVSTTVPKMMVNIQTQSRVITYAGCITQMCFFIFFVGLD
IFMLTVMAFDRFVAICHPLHYTVTMNPRLSGLLVLASWIMSALNSSLQSLIVLRLSFC
TDLEIPHFFCELNQVVHLACSDTFLNDMVMYLASALLGCGPLSGILYSYSKIVSSIRG

ISSAQGKYRAFSTCASHLSVVSLFYGTLLGVYFSSAATRNSHSSAAASVMYTVVTP" (SEQ ID NO:83).
BASE COUNT 125 a 179 c 142 g 203 t
ORIGIN
1 cttcatagac atctgttttg tgtccaccac tgtcccgaag atgatggtga acatccagac
61 acagagcaga gtcatcacct atgcaggctg catcacccag atgtgctttt tcatattctt
121 tgtgggactg gatatcttta tgctgaccgt gatggccttt gaccggtttg tggccatctg
181 tcacccccctg cactacacgg tcaccatgaa ccccaggctc agtgggctgc tggttctggc
241 gtcctggatc atgagtgccc tgaattcctc gttacaaagc ttaatagtgc tgcggctttc
301 cttctgcaca gacttggaaa ttccccactt tttctgtgaa cttaatcagg tggtccacct
361 tgcctgttct gacacctttc ttaatgacat ggtgatgtat ttggcatctg cactgctggg
421 ctgtggtccc ctctctggga tcctttattc ttattctaag atcgtttcct ccatacgtgg
481 aatctcatca gctcagggga agtacagggc attttccacc tgtgcatctc acctctcagt
541 tgtctcctta ttttatggta cgctcctagg agtgtacttt agttctgctg caacccgtaa
601 ctcacactca agtgctgcag cctcggtgat gtacaccgtg gttaccccc (SEQ ID NO:82).

OR58

LOCUS AF127871 646 bp DNA PRI 28-FEB-2000
DEFINITION Macaca sylvanus olfactory receptor (MSY6) gene, partial cds.
ACCESSION AF127871
KEYWORDS .
SOURCE Barbary ape.
ORGANISM Macaca sylvanus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Macaca.
REFERENCE 1 (bases 1 to 646)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 646)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..646
/organism="Macaca sylvanus"
/db_xref="taxon:9546"
gene <1..>646
/gene="MSY6"
CDS <1..>646
/gene="MSY6"
/codon_start=2
/product="olfactory receptor"
/translation="FTDLFFVTNTIPKMLVNLQSQNKAISYAGCLTQLYFLVSLVALD
NLILAVMAYDRYVAICCPLHYTTAMSPKLCILLLSLCWVLSVLYGLIHTFLMTTVTFC
GSRKIHYIFCEMYVLLRLACSDTQINHTVLIATGCFIFLIPFGFMIISYVLIVRAILR
IPSVSKKYKAFSTCASHLGVVSLFYGTLRMVYLKPLHTYSVKDSVATVMYAVVTP" (SEQ ID NO:85).
BASE COUNT 134 a 196 c 126 g 190 t
ORIGIN
1 cttcactgac ctcttctttg tcaccaacac aatccccaag atgctggtga acctccagtc

61 ccagaacaaa gccatctcct atgcagggtg tctgacacag ctctacttcc tggtctcctt
121 ggtggccctg gacaacctca tcctggctgt gatggcgtat gaccgctatg tggccatctg
181 ctgccccctc cactacacca cagccatgag ccctaagctc tgtatcttac tcctttcctt
241 gtgttgggtc ttatctgtgc tctatggcct catacacacc ttcctcatga ccacggtgac
301 cttctgtggg tcacgaaaaa tccactacat cttctgtgag atgtatgtat tgctgaggct
361 ggcatgttcc gacactcaga ttaatcacac agtgctgatt gccacaggct gctttatctt
421 cctcattccc tttggattca tgatcatttc ctatgtgttg attgtcagag ccatcctcag
481 aataccctca gtctctaaga aatacaaagc cttctccact tgtgcctccc atttgggtgt
541 agtctccctc ttctatggga cacttcgtat ggtatacctg aagcccctcc atacctactc
601 tgtgaaggac tcagtagcca cagtgatgta tgcggtggtg acaccc (SEQ ID NO:84).

OR59

LOCUS AF127872 649 bp DNA PRI 28-FEB-2000
DEFINITION Macaca sylvanus olfactory receptor (MSY7) gene, partial cds.
ACCESSION AF127872
KEYWORDS .
SOURCE Barbary ape.
ORGANISM Macaca sylvanus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Macaca.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..649
/organism="Macaca sylvanus"
/db_xref="taxon:9546"
gene <1..>649
/gene="MSY7"
CDS <1..>649
/gene="MSY7"
/codon_start=2
/product="olfactory receptor"
/translation="WVDICFSICIIPKMLVNIQTKNKTISYMDCLTQVYFSMFFPILD
TLLLTVMAYDRFVAVCHPLHYVTIMNPRLCGLLVFVTWLIGVMTPLLHISLLTHLTFC
KDFEIPHFFCELTHILQLACSDTFLNSTLIYVMTGVLGVFPLLGIIFSYSRIASSIRK
MSSSGGKEKALSTCGSHLSIVSLFYGTGIGVHFTSAVTHSSQNISVASVMYTVVTP" (SEQ ID NO:87).
BASE COUNT 129 a 190 c 127 g 203 t
ORIGIN
1 ctgggttgac atctgtttca gcatctgcat catccccaag atgctggtga acatccagac
61 caagaacaaa accatctctt acatggactg cctcacccag gtctatttct ccatgttttt
121 tcctattctg gacacgctac tcctgaccgt gatggcttat gaccggtttg tggccgtctg
181 ccacccccctg cactatgtaa ccatcatgaa cccccgcctc tgcggcctcc tggtttttgt
241 cacgtggctc attggtgtca tgacacccct cctccatatt tctctgttga cgcatctaac
301 cttctgtaaa gattttgaaa ttccacattt tttctgcgaa ctgacacaca tcctccagct

361 ggcctgctct gataccttcc tgaacagcac gttgatatat gttatgacag gtgtgctggg
421 cgtttttccc ctccttggga tcattttctc ttattcacga atcgcttcat ccataaggaa
481 gatgtcctca tctgggggaa aagagaaagc actttctacc tgtggctctc acctctccat
541 cgtttcttta ttttatggga caggcattgg ggtccatttc acttctgcgg tgactcattc
601 ttcccagaac atctccgtgg cctcggtgat gtacacggtg gttaccccc (SEQ ID NO:86).

OR60

LOCUS AF127873 645 bp DNA PRI 28-FEB-2000
DEFINITION Macaca sylvanus MSY8 pseudogene, partial sequence.
ACCESSION AF127873
KEYWORDS .
SOURCE Barbary ape.
ORGANISM Macaca sylvanus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Macaca.
REFERENCE 1 (bases 1 to 645)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 645)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..645
/organism="Macaca sylvanus"
/db_xref="taxon:9546"
gene <1..>645
/gene="MSY8"
/pseudo
BASE COUNT 117 a 185 c 142 g 201 t
ORIGIN
1 ctttgttgac atctgtttta tctccaccac cgtccccagg atgctgatga acatccaggc
61 atggagcaaa gacatctcct acgtggggtg cctcactcag gtgtattttt taatgatgtt
121 tgctggaatg gatactttcc tactggccat gatggcctat gaccggtttg tggccatctg
181 ccacccccctg cactacacgg tcatcatgaa cccctgcctc tgtggcatcc tggttctggc
241 atcttgattc atcattttat gggtctccct agttcatatt ctactgatga agagtttgat
301 ctccataggc actgagattc cgcatttctt ctgtgaactg gctcaggtcc tcaaggtgcc
361 cgctctgata ctctcctcgt taacattgtc ttgtatgtgg ccacagcact gctgggtgtg
421 cttcctgtag ctgggatcct cttctcctac tctcagatcg tctcctcctt aatgaggatg
481 tcctccaccg agggcaagta caaagccttt tccacctgtg ggtctcacct ctgtgtggtc
541 tccttgttct atggaacagg acttggggtc tatctcagtt ctgctgtgac ccattcttcc
601 cagagcagct ccatggcctc agtgatgtac accatggtca ccccc (SEQ ID NO:88).

OR61

LOCUS AF127874 649 bp DNA PRI 28-FEB-2000
DEFINITION Macaca sylvanus olfactory receptor (MSY9) gene, partial cds.
ACCESSION AF127874
KEYWORDS .
SOURCE Barbary ape.

ORGANISM Macaca sylvanus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Macaca.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..649
/organism="Macaca sylvanus"
/db_xref="taxon:9546"
gene <1..>649
/gene="MSY9"
CDS <1..>649
/gene="MSY9"
/codon_start=2
/product="olfactory receptor"
/translation="LADIGFTSTTVPKMLVNIQAQSNAISYAGCISQMYFFMVFGGID
TFLLTVMAYDRYVAICHPLYYPVIMNPRLCGLLVLVSWFLSLSYSLIQSLLMLQLSFC
TSWVIQHFYCELAQALTLACSDTHINYILLYVVTGLLGFVPFSGILFSYTQIVSSILR
ISSTDGKHKAFSTCGSHLSVVFLFYGTGLGVYLSSNASSSSWRGMVASVMYTVVTP" (SEQ
ID NO:90).
BASE COUNT 114 a 196 c 140 g 199 t
ORIGIN
1 cttggctgac atcggtttca cctccaccac agtccccaag atgctggtga acatccaggc
61 gcagagcaat gccatcagct atgcaggctg catctcccag atgtattttt tcatggtttt
121 tggaggcata gacacatttc tcctcaccgt gatggcctat gaccggtatg tggccatctg
181 tcacccccctg tactaccctg tcattatgaa ccccgcctc tgtggcctgc tggttcttgt
241 gtcctggttc ctcagcttgt catactccct gatccagagt ctgttgatgc tgcagttgtc
301 cttttgcacc agttgggtca ttcagcactt ttactgcgag cttgctcagg ccctcacgct
361 tgcctgctca gacacacaca tcaattacat cctgctctac gtggtgaccg gccttctggg
421 ttttgtgccc ttctcaggaa tccttttctc ctacacccaa attgtctcct ccatcctgag
481 aatctcatcc acagatggga aacacaaagc cttttctacc tgcggatctc atctgtctgt
541 ggtttttta ttctatggga caggccttgg tgtgtatctt agttccaatg catcgtcctc
601 ttcctggcgg ggcatggtgg cctcggtcat gtacactgtg gtcaccccc (SEQ ID NO:89).

OR62

LOCUS AF127875 649 bp DNA PRI 28-FEB-2000
DEFINITION Callithrix jacchus olfactory receptor (CJA21) gene, partial cds.
ACCESSION AF127875
KEYWORDS .
SOURCE Callithrix jacchus.
ORGANISM Callithrix jacchus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Callitrichidae; Callithrix.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..649
/organism="Callithrix jacchus"
/db_xref="taxon:9483"
gene <1..>649
/gene="CJA21"
CDS <1..>649
/gene="CJA21"
/codon_start=2
/product="olfactory receptor"
/translation="FVDICVTSTTLPKTLSNIQTHSKVITYAGCVTQLYFFVLFIGLD
SLLPTVMAYDRFVAICHPLHYTVIMNPQFCGLLVLVSWIMSALHSLTESLMVYPLLFC
TDLKIPQFFCEIHQIIQFACSDTFLNNLVMYLSTVLLGGGPLAGILYSYSKIASSIRA
ISSAEGKYKAFSTCASHLSVVSLFYCTGLGVYLSSAATHSSLSSAAASVMYTVVTP" (SEQ ID NO:92).
BASE COUNT 137 a 184 c 133 g 195 t
ORIGIN
1 ctttgtggac atctgtgtta cctccaccac acttccgaag acactgtcaa acatccagac
61 acacagcaaa gtcatcacct atgcaggctg cgtcacccag ttgtacttct ttgtactctt
121 catagggttg gacagcttac tcccgaccgt gatggcctat gaccggtttg tggccatctg
181 tcacccccctg cactacacgg tcatcatgaa ccctcagttc tgtggactgc tggttctggt
241 gtcctggatc atgagtgccc tgcattcttt gacagaaagc ttaatggtat acccactgct
301 cttttgtaca gacttgaaaa tccccccagtt tttctgtgaa attcatcaga taattcaatt
361 tgcctgttct gacacctttc ttaataacct ggtgatgtat ttgtcaactg tgctcctggg
421 cggtggtccc cttgctggga tcctgtactc ttactctaag atagcttcct ctatacgtgc
481 aatctcatca gctgagggga agtacaaggc attttccacc tgtgcatctc acctctcagt
541 tgtctcctta ttttattgta caggcctagg ggtgtacctg agttctgctg caacccacag
601 ctcactctca agcgcagcag cctcggtgat gtacacagtg gtcaccccc (SEQ ID NO:91).

OR63

LOCUS AF127876 649 bp DNA PRI 28-FEB-2000
DEFINITION Callithrix jacchus olfactory receptor (CJA22) gene, partial cds.
ACCESSION AF127876
KEYWORDS .
SOURCE Callithrix jacchus.
ORGANISM Callithrix jacchus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia; Eutheria; Primates; Platyrrhini; Callitrichidae; Callithrix.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission

JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..649
/organism="Callithrix jacchus"
/db_xref="taxon:9483"
gene <1..>649
/gene="CJA22"
CDS <1..>649
/gene="CJA22"
/codon_start=2
/product="olfactory receptor"
/translation="LVDICFTSTTVPKILVNIQEQSGTISYAGCIAQMYFFMVFGGMD
TFLLTVMAYDRYVAICHPLSYPVIVNPRLCGLLVLVSWFLSLSYSLIQSLLMLRLSFC
TSWVIQHFYCELAQVLTLACSDTHVNYILLYMVTGLLGCVPFSGILFSYIQIVSSILR
IPSTDGKHKAFSTCGSHLSVVSLFYGTGLGVYLSSNASSSSWWGMVASAMYTVVTP" (SEQ ID NO:94).
BASE COUNT 112 a 193 c 140 g 204 t
ORIGIN
1 cttggttgac atctgtttca cctccaccac agtccccaag attctggtga acatccagga
61 gcagagtggt accatcagct atgcaggctg cattgcccag atgtattttt tcatggtttt
121 tggaggcatg gacacatttc tcctcactgt gatggcctat gaccggtatg tggctatctg
181 tcacccccctg tcctaccctg tcattgtaaa ccccgcctc tgcggcctgt tggttcttgt
241 gtcctggttc ctcagcttgt catactccct gatccagagt ctgttgatgc tgcggctatc
301 cttctgcacc agttgggtca ttcagcactt ttactgtgag cttgctcagg ttctcacgct
361 tgcctgctca gacacacatg tcaattacat cctgctctac atggtgaccg gccttctggg
421 ctgtgttccc ttctcaggga tccttttctc ctacatccaa attgtctcct ccatcctgag
481 aatcccatcc acagatggga aacataaagc cttttctacc tgtggatctc atctgtctgt
541 ggtttcttta ttctacggga caggccttgg tgtctacctt agctccaatg cctcgtcctc
601 ttcctggtgg ggcatggtgg cctcagccat gtacacagtg gtcacccct (SEQ ID NO:93).

OR64

LOCUS AF127877 649 bp DNA PRI 28-FEB-2000
DEFINITION Callithrix jacchus olfactory receptor (CJA23) gene, partial cds.
ACCESSION AF127877
KEYWORDS .
SOURCE Callithrix jacchus.
ORGANISM Callithrix jacchus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Callitrichidae; Callithrix.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..649
/organism="Callithrix jacchus"
/db_xref="taxon:9483"

gene <1..>649
/gene="CJA23"
CDS <1..>649
/gene="CJA23"
/codon_start=2
/product="olfactory receptor"
/translation="FTDICFTTVIVPRMLVNFLSGTKVIPYMGCLVQMYFFMAFGNTD
SYLLASMAIDRLVAICNPLHYDVAMNPRHCLLMLLGSCSISHLHSLFRVLLMSHLSFC
ASHVIKHFFCDTQPVLKLSCSDTSSSQMVVMTETLAVIVTPFLCIIFSYLRIIITVLR
IPFAAGKWRAFSTCGSHLTVVALFYGSIYYVYFRPLSMYSVVKDRVATVMYTVVTP" (SEQ ID NO:96).

BASE COUNT 126 a 192 c 139 g 192 t

ORIGIN

1 tttcacggat atctgcttca caacagtcat agtgcccagg atgctggtga attttctatc
61 agggacaaag gttatcccct acatgggctg cctggtccaa atgtacttct tcatggcctt
121 tgggaacact gacagctacc tgctggcctc tatggccatc gaccggctgg tggccatctg
181 caacccctta cactatgatg tggctatgaa cccccggcat tgcctactca tgctattggg
241 ttcttgcagc atctcccacc tacattccct gttccgggtg ctacttatgt ctcacctgtc
301 tttctgtgcc tcccacgtca ttaagcactt tttctgtgac acccagcctg tgctaaagct
361 gtcctgctct gacacgtcct ccagccagat ggtggtcatg actgagactt tagctgtcat
421 tgtgaccccc ttcctgtgta tcatcttctc ctacctgcga atcatcatca ctgtgctcag
481 aatccccttt gcagctggga agtggagggc cttctctacc tgtggctccc acctcactgt
541 agtagccctt ttctacggga gtatatatta tgtctatttt aggcccctgt ccatgtactc
601 agtggtgaag gaccgagtag ccacagttat gtacacagta gtgacaccc (SEQ ID NO:95).

OR65

LOCUS AF127878 649 bp DNA PRI 28-FEB-2000
DEFINITION Callithrix jacchus olfactory receptor (CJA24) gene, partial cds.
ACCESSION AF127878
KEYWORDS .
SOURCE Callithrix jacchus.
ORGANISM Callithrix jacchus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Callitrichidae; Callithrix.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..649
/organism="Callithrix jacchus"
/db_xref="taxon:9483"
gene <1..>649
/gene="CJA24"
CDS <1..>649
/gene="CJA24"
/codon_start=2
/product="olfactory receptor"

/translation="FVDICFVSTTVPKMLVNIQTHSKVITFAGCITQIGHCLLFAVLD
VFMLTVMAYDRYVAICHPLHYTVTINPRLCGLLVLASWILSALNSSLQTLIVLRLSFC
TDLEIPHFFCELNQVIHLACSDTFLNDVVMYLAAVLLGGGPLAGILYSYSKIVSSIRA
ISSAQGKYKAFSTCVSHILIVSLFYGTLLGVYLSSAATGNSHSRAAASVMYTVVTP" (SEQ ID NO:98).

BASE COUNT 136 a 177 c 134 g 202 t

ORIGIN

1 ctttgtagac atctgttttg tgtctaccac tgtcccaaag atgctggtaa atatccagac
61 acacagcaaa gtcatcacct ttgcaggctg catcacccag ataggccatt gcctactctt
121 tgcagtattg gacgtcttta tgctgactgt gatggcctat gaccggtatg tggccatctg
181 tcacccactg cactacacag tcaccattaa ccccagactg tgtggactgc tggttctggc
241 atcctggatc ctgagtgccc tgaattcctc attacaaacc ttaatagtgc tgcggctttc
301 cttctgcaca gacttggaaa tcccccactt tttctgcgaa cttaatcagg tcatccacct
361 tgcctgttct gacacttttc ttaatgatgt ggtgatgtat ttggccgctg tgctgctggg
421 gggtggtccc cttgcaggga ttctttactc ttactctaag atagtttcct ccatacgtgc
481 aatctcatca gctcagggga agtacaaggc attttccacc tgtgtatctc acatcttaat
541 tgtctcctta ttttatggta cactcctagg tgtgtacctt agttctgctg caactggcaa
601 ctcacattca agagctgcag cctcggtgat gtacactgtg gtcaccccc (SEQ ID NO:97).

OR66

LOCUS AF127879 649 bp DNA PRI 28-FEB-2000
DEFINITION Callithrix jacchus olfactory receptor (CJA25) gene, partial cds.
ACCESSION AF127879
KEYWORDS .
SOURCE Callithrix jacchus.
ORGANISM Callithrix jacchus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Callitrichidae; Callithrix.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..649
/organism="Callithrix jacchus"
/db_xref="taxon:9483"
gene <1..>649
/gene="CJA25"
CDS <1..>649
/gene="CJA25"
/codon_start=2
/product="olfactory receptor"
/translation="FADICFTSTTVPKMLVDIQTQSKMITFAGCLTQIFFFVAFGCLD
NLLLTVMAYDRFVAICHPLHYAVIMNPRLCRLLVLGSWCISVMVSLLETLTILRLSFC
TNMEIPHFFCDVLEVLKLACSETLVNKIVMYFVTIAMGVFPLSGILYSYSQIFSSILR
VSPAQGQHKAFSTCGSHLSVVTLFYGTGLGVYLSLAATPSSRTSLMASVMYTMVTP" (SEQ ID NO:100).
BASE COUNT 130 a 183 c 136 g 200 t

ORIGIN
1 ctttgctgac atctgtttca catccacgac cgtcccaaag atgctggtgg atatccaaac
61 acaaagcaaa atgatcactt ttgcagggtg cctcacccag attttttttt tcgttgcatt
121 tggatgcctg gacaatttgc tcttgaccgt gatggcctat gaccggttcg tggccatctg
181 tcacccccctg cactacgcgg tcatcatgaa cccccggctc tgtagactgc tagttctggg
241 gtcctggtgc atcagtgtca tggtttctct gctcgagacc ttgaccattt tgaggctgtc
301 cttctgcaca aacatggaaa tcccacactt tttttgtgat gttctcgaag tcctgaagct
361 cgcctgttct gaaaccctcg tcaataaaat cgtgatgtat tttgtgacaa ttgcaatggg
421 tgtttttcct ctctctggaa tcctatactc ttattctcag attttctcct ccatcctgag
481 agtatcacct gcccaaggcc agcacaaagc cttttccacc tgtgggtctc acctctcagt
541 ggtcaccctg ttctatggca cgggccttgg ggtatatctc agtcttgcag ctacaccatc
601 ttctaggaca agtctgatgg cctcggtgat gtacaccatg gtcaccccc (SEQ ID NO:99).

OR67

LOCUS AF127880 649 bp DNA PRI 28-FEB-2000
DEFINITION Callithrix jacchus olfactory receptor (CJA26) gene, partial cds.
ACCESSION AF127880
KEYWORDS .
SOURCE Callithrix jacchus.
ORGANISM Callithrix jacchus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Callitrichidae; Callithrix.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..649
/organism="Callithrix jacchus"
/db_xref="taxon:9483"
gene <1..>649
/gene="CJA26"
CDS <1..>649
/gene="CJA26"
/codon_start=2
/product="olfactory receptor"
/translation="LADIGLTSTTVPRTIVNIQTHSRVIAYASCLTQMSFSIFFVCME
DMLLAVMAYDRFVAICHPLHYPVIMSPRLCGFLVLVSAFLSLLISQVHNLIVLQFSCF
KDIKISNFFCDPSQLLTLACSDTFVNNNIVMNFFAAVFGFLPISGIFLSYYKIVSSIL
RVPSSSGKYKAFSTCSSHLAVVCLFYGTVLGVYLGSSVSSPRKRVVTSVMYTVVTP" (SEQ ID NO:102).
BASE COUNT 138 a 161 c 124 g 226 t
ORIGIN
1 cttggctgac attggtttga cctccaccac cgtccccagg acaattgtga acattcaaac
61 tcacagcaga gtcatcgcct atgcaagctg cctgacacag atgtcttttt caatcttttt
121 tgtgtgtatg gaagacatgc tccttgctgt gatggcctat gaccggtttg tggccatctg
181 tcaccctctg cactatccag tcatcatgag cccacgactc tgtggcttct tagtgttggt
241 gtctgctttt cttagccttt taatatccca ggtgcacaat ttgattgtct tacaattttc

301 ttgcttcaaa gatataaaga tttctaattt cttctgtgac ccttctcaac tcctcacact
361 tgcttgttcc gacacgtttg tcaataacaa catagtcatg aatttctttg ctgctgtatt
421 tggttttctt cccatctcag ggatcttttt gtcttactat aaaattgttt cctccattct
481 gagagttcca tcatcaagtg ggaagtataa agccttctct acctgtagct ctcacctggc
541 agttgtttgc ttattttatg gaacagtcct tggagtgtac cttgggtcat cagtgtcatc
601 ccccaggaag agagtggtga cctcagtgat gtacacagtg gtcactccc (SEQ ID NO:101).

OR68

LOCUS AF127881 649 bp DNA PRI 28-FEB-2000
DEFINITION Callithrix jacchus olfactory receptor (CJA62) gene, partial cds.
ACCESSION AF127881
KEYWORDS .
SOURCE Callithrix jacchus.
ORGANISM Callithrix jacchus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Callitrichidae; Callithrix.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..649
/organism="Callithrix jacchus"
/db_xref="taxon:9483"
gene <1..>649
/gene="CJA62"
CDS <1..>649
/gene="CJA62"
/codon_start=2
/product="olfactory receptor"
/translation="FVDICFVSTTVPKTLVNIQTHSKVITFAGCITQIGHCLLFAVLD
VFMLTVMAYDRYVAICHPLHYTVTINPRLCGLLVLASWILSALNSSLQTLIVLRLSFC
TDLEIPHFFCVLNQVIHLACSDTFLNDVVMYLAAVLLGGGPLAGILYSYSKIVSSIRA
ISSAQGKYKAFSTCVSHILIVSLFYGTLLGVYLSSAATGNSHSRAAASVMYTVVTP" (SEQ ID
NO:104).
BASE COUNT 133 a 179 c 135 g 202 t
ORIGIN
1 ctttgtagac atctgttttg tgtctaccac tgtcccgaag acgctggtaa atatccagac
61 acacagcaaa gtcatcacct ttgcaggctg catcacccag ataggccatt gcctcctctt
121 tgcagtattg gacgtcttta tgctgactgt gatggcctat gaccggtatg tggccatctg
181 tcacccactg cactacacag tcaccattaa ccccagactg tgtggactgc tggttctggc
241 atcctggatc ctgagtgccc tgaattcctc attacaaacc ttaatagtgc tgcggctttc
301 cttctgcaca gacttggaaa tcccccactt tttctgcgta cttaatcagg tcatccacct
361 tgcctgttct gacacttttc ttaatgatgt ggtgatgtat ttggccgctg tgctgctggg
421 gggtggtccc cttgcaggga ttctttactc ttactctaag atagtttcct ccatacgtgc
481 aatctcatca gctcagggga agtacaaggc attttccacc tgtgtatctc acatcttaat
541 tgtctcctta ttttatggta cactcctagg tgtgtacctt agttctgctg caactggcaa
601 ctcacattca agagctgcag cctcggtgat gtacactgtg gtcacccccc (SEQ ID NO:103).

OR69

LOCUS AF127882 649 bp DNA PRI 28-FEB-2000
DEFINITION Callithrix jacchus olfactory receptor (CJA80) gene, partial cds.
ACCESSION AF127882
KEYWORDS .
SOURCE Callithrix jacchus.
ORGANISM Callithrix jacchus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Callitrichidae; Callithrix.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..649
/organism="Callithrix jacchus"
/db_xref="taxon:9483"
gene <1..>649
/gene="CJA80"
CDS <1..>649
/gene="CJA80"
/codon_start=2
/product="olfactory receptor"
/translation="FTDICFTTVIVPRMLVNFLSETKVISYMGCLVPMYFFMAFANTD
SYLLASMAIDRLVAICNPLHYDVAMNSRRCLLMLLGSCSISHLHSLFRVLLMSRLSFC
ASHVIKHFFCDTQPVLKLSCSDTSSSQMVVMTETLAVIVTPFLCIIFSYLRIIITVLR
IPSAAGKWRAFSTCGSHLTVVALFYGSIIYVYFRPLSMYSVVKDRVATVMYTVVTP" (SEQ
ID NO:106).
BASE COUNT 123 a 194 c 139 g 193 t
ORIGIN
1 tttcacggat atctgcttca caacagtcat agtgcccagg atgctggtga attttctatc
61 agagacaaag gttatctcct acatgggctg cctggtccca atgtacttct tcatggcctt
121 tgcgaacact gacagctacc tgctggcctc tatggccatc gaccggctgg tggccatctg
181 caacccctta cactatgatg tggctatgaa ctcccggcgt tgcctactca tgctattggg
241 ttcttgcagc atctcccacc tacattccct gttccgggtg ctacttatgt ctcgcctgtc
301 tttctgtgcc tcccacgtca ttaagcactt tttctgtgac acccagcctg tgctaaagct
361 gtcctgctct gacacgtcct ccagccagat ggtggtcatg actgagacct tagctgttat
421 tgtgaccccc ttcctgtgta tcatcttctc ctacctgcga atcatcatca ctgtgctcag
481 aatcccctct gcagccggga agtggagggc cttctctacc tgtggctccc acctcactgt
541 agtagcccct ttctacggga gtattattta tgtctatttt aggcccctgt ccatgtactc
601 agtggtgaag gaccgagtag ccacagttat gtacacagta gtgacaccc (SEQ ID NO:105).

OR70

LOCUS AF127883 649 bp DNA PRI 28-FEB-2000
DEFINITION Callithrix jacchus olfactory receptor (CJA81) gene, partial cds.
ACCESSION AF127883

KEYWORDS .
SOURCE Callithrix jacchus.
ORGANISM Callithrix jacchus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Callitrichidae; Callithrix.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..649
/organism="Callithrix jacchus"
/db_xref="taxon:9483"
gene <1..>649
/gene="CJA81"
CDS <1..>649
/gene="CJA81"
/codon_start=2
/product="olfactory receptor"
/translation="FADICFTSTTVPKMLVDIQTQSKMITFAGCLTQIFFFVAFGCLD
NLLLTVMAYDRFVAICHPLHYAVIMNPRLCRLLVLGSWCISVMVSLLETLTILRLSFC
TNMEIPHFFCDVLEVLKLACSETLVNKIVMYFVTIAMGVFPLSGILYSYSQIFSSILR
VSPAQGQHKAFSTCGSHLSVVTLFYGTGLGVYLSSAATPSSRTSLMASVMYTMVTP" (SEQ
ID NO:108).
BASE COUNT 130 a 184 c 136 g 199 t
ORIGIN
1 ctttgctgac atctgcttca catccacgac cgtcccaaag atgctggtgg atatccaaac
61 acaaagcaaa atgatcactt ttgcagggtg cctcacccag atttttttt tcgttgcatt
121 tggatgcctg gacaatttgc tcttgaccgt gatggcctat gaccggttcg tggccatctg
181 tcacccccctg cactacgcgg tcatcatgaa ccccggctc tgtagactgc tagttctggg
241 gtcctggtgc atcagtgtca tggtttctct gctcgagacc ttgaccattt tgaggctgtc
301 cttctgcaca aacatggaaa tcccacactt tttttgtgat gttctcgaag tcctgaagct
361 cgcctgttct gaaaccctcg tcaataaaat cgtgatgtat tttgtgacaa ttgcaatggg
421 tgtttttcct ctctctggaa tcctatactc ttattctcag attttctcct ccatcctgag
481 agtatcacct gcccaaggcc agcacaaagc cttttccacc tgtgggtctc acctctcagt
541 ggtcaccctg ttctatggca cgggccttgg ggtatatctc agttctgcag ctacaccatc
601 ttctaggaca agtctgatgg cctcggtgat gtacaccatg gtcaccccc (SEQ ID NO:107).

OR71

LOCUS AF127884 649 bp DNA PRI 28-FEB-2000
DEFINITION Callithrix jacchus olfactory receptor (CJA82) gene, partial cds.
ACCESSION AF127884
KEYWORDS .
SOURCE Callithrix jacchus.
ORGANISM Callithrix jacchus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Callitrichidae; Callithrix.
REFERENCE 1 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..649
/organism="Callithrix jacchus"
/db_xref="taxon:9483"
gene <1..>649
/gene="CJA82"
CDS <1..>649
/gene="CJA82"
/codon_start=2
/product="olfactory receptor"
/translation="FADICFTSTTVPKMLVGIQTQSKMITFAGCLTQIFFFVAFGCLD
NLLLTVMAYDRFVAICHPLHYAVIMNPRLCRLLVLGSWCISVMVSLLETLTILRLSFC
TNMEIPHFFCDVLEVLKLACSETLVNKIVMYFVTIAMGVFPLSGILYSYSQIFSSILR
VSPAQGQHKAFSTCGSHLSVVTLFYGTGLGVYLSSAATPSSRTSLMASVMYTMVTP" (SEQ ID NO:110).
BASE COUNT 129 a 183 c 137 g 200 t
ORIGIN
1 ctttgctgac atctgtttca catccacgac cgtcccaaag atgctggtgg gtatccaaac
61 acaaagcaaa atgatcactt ttgcagggtg cctcacccag attttttttt tcgttgcatt
121 tggatgcctg gacaatttgc tcttgaccgt gatggcctat gaccggttcg tggccatctg
181 tcacccccctg cactacgcgg tcatcatgaa cccccggctc tgtagactgc tagttctggg
241 gtcctggtgc atcagtgtca tggtttctct gctcgagacc ttgaccattt tgaggctgtc
301 cttctgcaca aacatggaaa tcccacactt tttttgtgat gttctcgaag tcctgaagct
361 cgcctgttct gaaaccctcg tcaataaaat cgtgatgtat tttgtgacaa ttgcaatggg
421 tgtttttcct ctctctggaa tcctatactc ttattctcag attttctcct ccatcctgag
481 agtatcacct gcccaaggcc agcacaaagc cttttccacc tgtgggtctc acctctcagt
541 ggtcaccctg ttctatggca cgggccttgg ggtatatctc agttctgcag ctacaccatc
601 ttctaggaca agtctgatgg cctcggtgat gtacaccatg gtcaccccc (SEQ ID NO:109).

OR72

LOCUS AF127885 658 bp DNA PRI 28-FEB-2000
DEFINITION Pongo pygmaeus PPY10 pseudogene, partial sequence.
ACCESSION AF127885
KEYWORDS .
SOURCE orangutan.
ORGANISM Pongo pygmaeus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia; Eutheria; Primates; Catarrhini; Hominidae; Pongo.
REFERENCE 1 (bases 1 to 658)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 658)
AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..658
/organism="Pongo pygmaeus"
/db_xref="taxon:9600"
gene <1..>658
/gene="PPY10"
/pseudo
BASE COUNT 131 a 176 c 135 g 216 t
ORIGIN
1 cttgcctgac atcggtttca cctcccgcat ggtccccaag atgattgtgg acatccaatc
61 tcacagcaga gtcatttcct aggcaggcta cctgactcag atgtctctct ttgccatttt
121 tggaggcgtg gaagagagac atgctcctga gtgtgaaggc ctatgaccgg tttgtagcca
181 cctgtcaccc tctgtatcat tcagccatca tgaagtcatg tttctgtggc tttctagttt
241 tgttgtcttt ttttttctc tcagtctttt agacgcccaa ctgcacaact tgattgcctt
301 gcaaatggcc tgctttgagg atgtggaaat ttctaatttc ttctgtgacc cttctcaact
361 ccccatcttg catgttgtga cagcttcacc gataacatca tcacgtatct ccctgacgcc
421 atatcccct ttattcccat ctcggggacc cttttctcta taatatcaaa ttgtttcctc
481 cattctgagg gcttcatcat caggtgggag gtataaagcc ttctccatct gtgggtctca
541 cctgtcagtt gtttgcttat tttatggaac aggcatatgg gggtacctca gttcagatgt
601 gtcatcttcc ctgagaaagg ctgcagtgac ctcagtgatg tacaccgtgg tcaccccc (SEQ ID NO:111).

OR73

LOCUS AF127886 649 bp DNA PRI 28-FEB-2000
DEFINITION Pongo pygmaeus olfactory receptor (PPY11) gene, partial cds.
ACCESSION AF127886
KEYWORDS .
SOURCE orangutan.
ORGANISM Pongo pygmaeus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia; Eutheria; Primates; Catarrhini; Hominidae; Pongo.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..649
/organism="Pongo pygmaeus"
/db_xref="taxon:9600"
gene <1..>649
/gene="PPY11"
CDS <1..>649
/gene="PPY11"
/codon_start=2
/product="olfactory receptor"
/translation="LADIGFTSTTVPKMIVDMQTHSRVISYAGCLTQMSFFVLFACMD

DMLLSVMAYDRFVAICHPPDYPVTMNPCFCGFLVLLSFFLSLLDSQLHNWIALQITCF
KDVEIPNFFCDPSQLPHLACCDTFTNDIVMYFLAAIFGFLPILGILFSYYKIVSSILR
VSSSGGRYKAFATCGSHLSVVCLFYGTALGGYLSSDMSSYPRKGAVASVMYTVVTP" (SEQ ID NO:113).

BASE COUNT 125 a 174 c 130 g 220 t
ORIGIN
1 cttggctgac atcggtttca cctccaccac ggtccccaag atgattgtgg acatgcaaac
61 tcacagcaga gtcatctcct atgcaggctg cctgactcag atgtcttttt ttgtcctttt
121 tgcatgtatg gatgacatgc ttctgagtgt gatggcctat gaccggtttg tggccatctg
181 tcaccctccg gattacccag ttaccatgaa cccatgtttc tgtggcttcc tagttttgtt
241 gtctttttt ctcagtcttt tagactccca gctgcacaat tggattgcct tacaaattac
301 ctgcttcaag gatgtggaaa ttcccaattt cttctgtgac ccttcccaac tcccccacct
361 tgcctgttgt gacaccttca ccaatgacat agtcatgtat ttccttgctg ccatatttgg
421 ttttcttccc atcttgggga tccttttctc ttactataaa attgtttcct ccattctgag
481 ggtttcatca tcaggtggga ggtataaagc cttcgccacc tgtggctctc acctgtcagt
541 tgtttgctta ttttatggaa cagcccttgg agggtacctc agttcagaca tgtcctctta
601 tcccagaaag ggtgcagtgg cttcagtgat gtacacagtg gtcaccccc (SEQ ID NO:112).

OR74

LOCUS AF127887 654 bp DNA PRI 28-FEB-2000
DEFINITION Pongo pygmaeus PPY12 pseudogene, partial sequence.
ACCESSION AF127887
KEYWORDS .
SOURCE orangutan.
ORGANISM Pongo pygmaeus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pongo.
REFERENCE 1 (bases 1 to 654)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 654)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..654
/organism="Pongo pygmaeus"
/db_xref="taxon:9600"
gene <1..>654
/gene="PPY12"
/pseudo
BASE COUNT 124 a 178 c 135 g 217 t
ORIGIN
1 cttgcctgaa atcggtttca cctccaccac gatccccaag attgtggaca tccaatctca
61 cagcagagtc atctcctctg caggcttgcc tgactcagat gtctctttgc cattttgga
121 ggcacggaag agagacatgc tcctgagtgt gatggcctat gaccggtttg tagccatctg
181 tcaccctcta tatcattcag tcatcatgag cccgtgtttc tgtggcttcc tagttttgtt
241 gtctttttt ttcttctcag tcttttagac tcccagctgc accacttgat tgccttgcta
301 atgacctact tcaaggatgt ggaaattccg aatttcttct gtgatccttc tcaactcccc
361 catattgcat gttgtgatgc cttcaccaat aacatcatca tgtatttccc tgtcaacatg
421 tttgcttttc ttcccatctc ggggactctt ttctcttact ctaatattgt ctcctccatt

481 ctgagggttt cgtcatcagg tgggaaatat aaagccctct ccacctgtgg gtctcactgg
541 tcagttgttt gctgagcttc tggaacaggc gttggagggt acctcagttc agatgtgtca
601 tcttccccca gaaagggtgc agtggcctca gtgatgtgca ccgtggtcac cgcc (SEQ ID NO:114).

OR75

LOCUS AF127888 649 bp DNA PRI 28-FEB-2000
DEFINITION Pongo pygmaeus olfactory receptor (PPY49) gene, partial cds.
ACCESSION AF127888
KEYWORDS .
SOURCE orangutan.
ORGANISM Pongo pygmaeus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pongo.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..649
/organism="Pongo pygmaeus"
/db_xref="taxon:9600"
gene <1..>649
/gene="PPY49"
CDS <1..>649
/gene="PPY49"
/codon_start=2
/product="olfactory receptor"
/translation="FVDTCFISTTVPKMLVNIQARSKEISYMGCLTQVYFLMMFAGMD
TFLLAVMAYDRFVAICHPLQYAVIMNPHLCGLLVLASWFIIFWVSLVHILLMKRLTFS
TGTEIPHFFCELAQVLKVARSDTLLNNIVLYVATALLGVFPVAGILFSYSQIVSSLMR
MSSTEGKYKAFSTCGSHLCVVSLFNGTGLGVYLSSAVTHSSQSSSMASVMYAMVTP" (SEQ ID NO:116).
BASE COUNT 119 a 187 c 146 g 197 t
ORIGIN
1 ctttgtggac acctgtttca tctccaccac agtccccaag atgctagtga acatccaggc
61 acggagcaaa gaaatctcct acatggggtg cctcactcag gtgtattttt taatgatgtt
121 tgctggaatg gatactttcc tactggctgt gatggcttat gaccggtttg tggccatctg
181 ccacccccct cagtacgcgg tcatcatgaa cccccatctc tgtggcctgc tggttctggc
241 atcttggttc atcattttct gggtctccct ggttcatatt ctactgatga agaggctgac
301 cttctccaca ggcactgaga ttccgcattt cttctgtgaa ctggctcagg tcctcaaggt
361 ggcccgctct gataccctcc tcaataacat tgtcttgtat gtggccacgg cactgctggg
421 tgtgtttcct gtagctggga tcctcttctc ctactctcag atcgtctcct ccttaatgag
481 aatgtcctcc accgagggca agtacaaagc cttttccacc tgtggatctc acctctgtgt
541 ggtctccttg ttcaatggaa caggacttgg ggtctatctc agttctgctg tgacccattc
601 ttcccagagc agctccatgg cctcagtgat gtatgccatg gtcacccccc (SEQ ID NO:115).

OR76

LOCUS AF127889 660 bp DNA PRI 28-FEB-2000
DEFINITION Pongo pygmaeus PPY50 pseudogene, partial sequence.
ACCESSION AF127889
KEYWORDS .
SOURCE orangutan.
ORGANISM Pongo pygmaeus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pongo.
REFERENCE 1 (bases 1 to 660)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 660)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..660
/organism="Pongo pygmaeus"
/db_xref="taxon:9600"
gene <1..>660
/gene="PPY50"
/pseudo
BASE COUNT 122 a 181 c 146 g 211 t
ORIGIN
1 cttgcctgac atcagtttca cctccaccac ggtccccaag atgattgtgg acatccaatc
61 tcacagcaga gtcatctcct atgcaggctg cctgactcag atgtgtctcc tggccatttt
121 tggaggcatg gaagagagac atgctcctga gtgtgatggc ctatgagcgg tttgtagccc
181 tctgtcaccc tctatatcgt tcagccatct tgaacccgtg tttctgtggc ttcctagatt
241 tgtggtcttt gttttctttt tcctcagtct tttagactcc cagctgcgca acttgattgc
301 cttacgcatg acctgcttca aggatgtgga aattcctaat ttcttctggg aaccttctca
361 actcccccat cttacatttt gtgacacctt caccagtaac atccacatgt atttccctgc
421 tgccgtattt ggttttcttc ccatctcggg ggccctttttc tcttacggta aaattgtttc
481 ctccattctg agggtttcat catcaggtgg gaagtatcaa ccttctccac ctgtgggtct
541 cacctgtcag ttgtttgctg attttacgga acaggcgttg gagggtagct gggttcagat
601 gtgtcatccc ccccgagaaa gggtgcagtg gcctcagtga tgtacacggt ggtcaccccc (SEQ ID NO:117).

OR77

LOCUS AF127890 648 bp DNA PRI 28-FEB-2000
DEFINITION Pongo pygmaeus PPY51 pseudogene, partial sequence.
ACCESSION AF127890
KEYWORDS .
SOURCE orangutan.
ORGANISM Pongo pygmaeus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pongo.
REFERENCE 1 (bases 1 to 648)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 648)

AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..648
/organism="Pongo pygmaeus"
/db_xref="taxon:9600"
gene <1..>648
/gene="PPY51"
/pseudo
BASE COUNT 128 a 183 c 134 g 203 t
ORIGIN
1 ctttgctgac atctgttttg tgtctagcac tctaccaaag atgctggtga atatccagac
61 acacagcaaa gtcatcacct atgcaggctg catcacccag gtgtgctttt tcgtattctt
121 tgcaggattg gacatctttc tcctgactgt gatggcctat gacggtttgt ggccatctgt
181 caccccctgc actacacggt catcatgagc cccaggctct gtggactgct ggttctggca
241 tcctggatca tgagtgccct gaattccttg ctacaaagct taatagtact gcggctttcc
301 ttctgcacag atttggaaat cccccacttt ttctgtgaac ttaatcaggt cacccacctt
361 gcctgttctg acacctttct taacgacatg gtgatgtatt tgtcatctgc gttgtggggc
421 ggtgctcccc tcactgggat cctttactct tactctaaga ttgtttcctc catacgtgca
481 atctcatcag ctcaggggaa gtacaaggca ttttccacct atgcgtctca cctctcagtt
541 gtctccttat tttatggtac actcctaggg gtgtaccttа gttctgctgc aacccacaac
601 tcatactcaa gtgctgcagc ctcggtgatg tacactgtgg tcaccccc (SEQ ID NO:118).

OR78

LOCUS AF127891 660 bp DNA PRI 28-FEB-2000
DEFINITION Pongo pygmaeus PPY52 pseudogene, partial sequence.
ACCESSION AF127891
KEYWORDS .
SOURCE orangutan.
ORGANISM Pongo pygmaeus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia; Eutheria; Primates; Catarrhini; Hominidae; Pongo.
REFERENCE 1 (bases 1 to 660)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 660)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..660
/organism="Pongo pygmaeus"
/db_xref="taxon:9600"
gene <1..>660
/gene="PPY52"
/pseudo
BASE COUNT 122 a 181 c 146 g 211 t
ORIGIN
1 cttgcctgac atcagtttca cctccaccac ggtccccaag atgattgtgg acatccaatc

61 tcacagcaga gtcatctcct atgcaggctg cctgactcag atgtgtctcc tggccatttt
121 tggaggcatg gaagagagac atgctcctga gtgtgatggc ctatgagcgg tttgtagccc
181 tctgtcaccc tctatatcgt tcagccatct tgaacccgtg tttctgtggc ttcctagatt
241 tgtggtcttt gttttctttt tcctcagtct tttagactcc cagctgcgca acttgattgc
301 cttacgcatg acctgcttca aggatgtgga aattcctaat ttcttctggg aaccttctca
361 actcccccat cttacatttt gtgacacctt caccagtaac atccacatgt atttccctgc
421 tgccgtattt ggttttcttc ccatctcggg ggccctttte tcttacggta aaattgtttc
481 ctccattctg agggtttcat catcaggtgg gaagtatcaa ccttctccac ctgtgggtct
541 cacctgtcag ttgtttgctg attttacgga acaggcgttg gagggtagct gggttcagat
601 gtgtcatccc ccccgagaaa gggtgcagtg gcctcagtga tgtacacggt ggtcaccccc (SEQ ID NO:119).

OR79

LOCUS AF127892 633 bp DNA PRI 28-FEB-2000
DEFINITION Pongo pygmaeus PPY76 pseudogene, partial sequence.
ACCESSION AF127892
KEYWORDS .
SOURCE orangutan.
ORGANISM Pongo pygmaeus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pongo.
REFERENCE 1 (bases 1 to 633)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 633)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..633
/organism="Pongo pygmaeus"
/db_xref="taxon:9600"
gene <1..>633
/gene="PPY76"
/pseudo
BASE COUNT 134 a 155 c 124 g 220 t
ORIGIN
1 cttgcctgac attggtttca ccttggccac ggtccccaag atgattgtag acatgcaatc
61 acatagcaaa gtcatctccc atgcgggctg tctgacacag atatctttct ttgtcctttt
121 tgcatgtata gatgacatgc tcctgactgt gatggcctat gactgattcg tggccatctg
181 tcacccccctg aactacccag tcatcatgaa tcctcacctc tgtgtcttct tagtgttggt
241 gtctttttcc ttagcctgtt ggattcccag ctgcacaatt ggattgttac aattcacctg
301 cttcaagaat gtggaaatct ttaattttgt ctgtgactga tctcaacctt gcctgttctg
361 actgtgtcat cagtaacata ttcatacatt tagatagtac aatacttggt tttcttccca
421 tttcagggat ccttttgtct tactataaaa ttgtgccctc cattctaaga attccattgt
481 cagatgggaa gtataaagcc ttctccacct gtggctctca cctggcaatt gtttgcttat
541 tttatggaac aggcattggt gtgtacctga cttcagctgt gtcactatcc cccaggaatg
601 gtgtggtcag tgttgtatgt tgtggccacc ccc (SEQ ID NO:120).

OR80

LOCUS AF127893 648 bp DNA PRI 28-FEB-2000
DEFINITION Pongo pygmaeus PPY77 pseudogene, partial sequence.
ACCESSION AF127893
KEYWORDS .
SOURCE orangutan.
ORGANISM Pongo pygmaeus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pongo.
REFERENCE 1 (bases 1 to 648)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 648)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..648
/organism="Pongo pygmaeus"
/db_xref="taxon:9600"
gene <1..>648
/gene="PPY77"
/pseudo
BASE COUNT 140 a 172 c 129 g 207 t
ORIGIN
1 ctttgctgac ctctgtttta cctccacaac cgtcccaaag atgctactga atatactgac
61 acagaacaaa ttcataacat atgcaggctg tctcggtcag attttctttt tcacttcatt
121 tggatgcctg gacaatttac tcttgaccgt gatggcctat gaccgcttca tggccatctg
181 tcacccccctg cactacacac ggtcatcatg aaccaccagc tctgtggact gctggttcta
241 gggtcctagt gcatcagtgt catgggtccc tgctcaagac cttgactgtt ttgaggctgt
301 cctctgcaca aaatggaaat tccacacttt ttttgtgatc ttcttgaagt cctgaagctc
361 gcctgttctg acaccttcat caataacgta gtgatatact ttgcaactgg catcctgggt
421 gtgattccct tcactggaat acttttctct tactataaaa ttgttttctc tatactgagg
481 atttcctcag ctgggagaaa gtgcaaagcg ttttccacct gtggttccca cctctcagtg
541 gtcagcttgt tctatggcac aggttttggg gtctatctca gttctgcagc tacaccatct
601 tctaggacaa gtctggtggc ctcagtgatg tacaccatgg ttaccccc (SEQ ID NO:121).

OR81

LOCUS AF127894 660 bp DNA PRI 28-FEB-2000
DEFINITION Pongo pygmaeus PPY78 pseudogene, partial sequence.
ACCESSION AF127894
KEYWORDS .
SOURCE orangutan.
ORGANISM Pongo pygmaeus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pongo.
REFERENCE 1 (bases 1 to 660)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates

JOURNAL Unpublished
REFERENCE 2 (bases 1 to 660)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..660
/organism="Pongo pygmaeus"
/db_xref="taxon:9600"
gene <1..>660
/gene="PPY78"
/pseudo
BASE COUNT 118 a 185 c 140 g 217 t
ORIGIN
1 cttgcctgac atcggtttca cctccaccac ggtccccaag atgattgtgg acatccaatc
61 tcacagcaga gtcatctcct atgcaggctg cctgactcag atgtgtctcc tggccatttt
121 tggaggcatg gaagagagac atgctcctga gtgtgatggc ctatgagcgg tttgtagccc
181 tctgtcaccc tctatatcgt tcagccatct tgaacccgtg tttctgtggc ttcctagatt
241 tgtggtcttt gttttctttt tcctcagtct tttagactcc cagctgcaca acttgattgc
301 cttacgcatg acctgcttca aggatgtgga aattcctaat ttcttctggg aaccttctca
361 actcccccat cttacatttt gtgacacctt caccagtaac atccacatgt atttccctgc
421 tgccgtattt ggttttcttc ccatctcggg ggccctttte tcttactgta aaactgtttc
481 ctccattctg agggtttcat catcaggtgg ggagtatcaa ccttctccac ctgtgggtct
541 cacctgtcag ttgtttgctt attttatgga acagcccttg gagggtacct cagttcagct
601 gtgtcccttt cctccaggaa gggtgcagtg gcctcagtga tgtacctggt ggtcaccccc (SEQ ID NO:122).

OR82

LOCUS AF127895 649 bp DNA PRI 28-FEB-2000
DEFINITION Pongo pygmaeus PPY85 pseudogene, partial sequence.
ACCESSION AF127895
KEYWORDS .
SOURCE orangutan.
ORGANISM Pongo pygmaeus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia; Eutheria; Primates; Catarrhini; Hominidae; Pongo.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..649
/organism="Pongo pygmaeus"
/db_xref="taxon:9600"
gene <1..>649
/gene="PPY85"
/pseudo
BASE COUNT 118 a 174 c 131 g 226 t

ORIGIN
1 cttggctgac atcagttttg cctctaccac ggtccccaag atgattgtgg acatccaggc
61 tcacagcaga ctcatctctt atgtgggctg cctgactcag atgtcttttt tgatcctttt
121 cgcatgtatg gaaagtctgc tcctgactgt gatggcctat gaccggtttg aggccatctg
181 tcacccccctg cactcccaag tcatcacgag cccacgactc tgtggcctct tagttttggt
241 gtctttttt cttagccttt tggactctca gctgcacaat ttgattgtgt tacaacttac
301 ctgcttcaat gatgtggaaa tctctaattt tttcctgtga cccttctcaa cttctcagcc
361 tggcctgttc tgacacctcc attaataaca tggtcgtata ttttattggt gccatatttg
421 gttttctccc tctcttaggg atccttttct cttactataa aattatttct tccattctgc
481 gagttcgctc ttcaggtggg aagtataaag ccttctccac ctgcagctct cacctgtcag
541 ttgtttgctt attttatgga acagcccttg gagggtacct cagttcagct gtgtcccttt
601 cctccaggaa gggtgcagtg gcctcagtga tgtacctggt ggtcacccc (SEQ ID NO:123).

OR83

LOCUS AF127896 649 bp DNA PRI 28-FEB-2000
DEFINITION Pongo pygmaeus olfactory receptor (PPY9) gene, partial cds.
ACCESSION AF127896
KEYWORDS .
SOURCE orangutan.
ORGANISM Pongo pygmaeus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pongo.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..649
/organism="Pongo pygmaeus"
/db_xref="taxon:9600"
gene <1..>649
/gene="PPY9"
CDS <1..>649
/gene="PPY9"
/codon_start=2
/product="olfactory receptor"
/translation="FVDICFASTTVPKMLVNIQAQSKVITYAGCITQMYFFTHFVGLD
SFLLTVMAYDRFVAICHPLHYTVIMNPQLCGLLVLASWIMSVLHSLLQSLMVLRLSLC
RELEIPHFFCELNQVIHLACSDTFLDDMVMYLAAVLLGGGCLAGILYSYSKIVSSICA
ISSAQGKYKAFSTCASHLSVVSLFYCTSLGVYLSSAAIHNSHSSAIASVMYTVVTP" (SEQ ID NO:125).
BASE COUNT 136 a 173 c 140 g 200 t
ORIGIN
1 ctttgtagac atctgttttg cctctaccac ggtcccaaag atgctggtga atatccaggc
61 acagagcaaa gttatcacct atgcaggctg catcacccag atgtactttt tcacacattt
121 tgtaggattg gacagcttcc tcctaactgt gatggcctat gaccggtttg tggccatctg
181 tcacccccctg cactacacgg tcatcatgaa ccctcaactc tgtggattgc tggttctggc
241 gtcctggatc atgagtgtct tgcattcctt attacaaagc ttaatggtgc tgcggttgtc

301 cttatgcaga gagttggaaa tcccccactt tttctgcgaa cttaatcagg tcatccacct
361 tgcctgttct gacacctttc ttgatgacat ggtgatgtat ttggcagctg tgctgctggg
421 tgggggatgt ctcgctggga tcctttactc ctactctaag atagtttcct ccatatgtgc
481 aatctcatca gctcaaggga agtataaggc attttccacc tgtgcatctc acctctcagt
541 tgtctccttg ttttattgta cgagcctagg agtgtacctt agctcggctg caatccacaa
601 ctcacactca agtgcaatag cctcagtgat gtacaccgtg gtcaccccc (SEQ ID NO:124).

OR84

LOCUS AF127897 649 bp DNA PRI 28-FEB-2000
DEFINITION Saimiri boliviensis olfactory receptor (SBO27) gene, partial cds.
ACCESSION AF127897
KEYWORDS .
SOURCE Bolivian squirrel monkey.
ORGANISM Saimiri boliviensis
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..649
/organism="Saimiri boliviensis"
/db_xref="taxon:27679"
gene <1..>649
/gene="SBO27"
CDS <1..>649
/gene="SBO27"
/codon_start=2
/product="olfactory receptor"
/translation="LVDFCLATDTIPKMLVSLQTRSKAISYPCCLTQMYFFHFFGIVD
SVLIAVMAYDRFVAICHPLHYATIMSPRLCGLLVGAPWVFSCFISLTHILLMARLVFC
GSLKVPHYLCDLTPILRLSCTDTSVNRIFILTVAGMVIATPFICILASYACILVAIMK
IPSAGGRKKAFSTCSSHLSVVALFYGTTIGVYLCPSSVHTAVKEKASAVMYTVVTP" (SEQ ID NO:127).
BASE COUNT 112 a 218 c 145 g 174 t
ORIGIN
1 cctggttgat ttctgtctgg ccaccgacac catccccaag atgctggtga gccttcaaac
61 caggagcaag gccatctctt atccctgctg cctgacccag atgtacttct tccatttctt
121 tggcatcgtg gacagcgtct taattgctgt aatggcgtat gaccgctttg tggccatctg
181 ccacccccttg cactacgcca cgatcatgag cccacgcctc tgtggcctgc tggtcggggc
241 cccctgggtg ttttcatgct tcatctcact cacccacatc ctcctgatgg cccgcctcgt
301 tttctgcggc agcctcaagg tgcctcatta cttgtgcgac ctcactccca tcctccgact
361 ttcgtgcaca gacacgtctg tgaacaggat tttcatcctc actgtggcag ggatggtgat
421 agccacgccc ttcatctgca tcctggcctc ctatgcttgc atccttgtag ccatcatgaa
481 gatcccctct gcaggtggca ggaagaaagc cttctccacc tgcagctccc acctgtccgt
541 ggttgctctc ttctatggga ccaccattgg ggtctacctg tgtccctcct cggtccacac
601 cgctgtaaag gagaaagctt ctgctgtgat gtacacagta gtcaccccc (SEQ ID NO:126).

OR85

LOCUS AF127898 646 bp DNA PRI 28-FEB-2000
DEFINITION Saimiri boliviensis olfactory receptor (SBO28) gene, partial cds.
ACCESSION AF127898
KEYWORDS .
SOURCE Bolivian squirrel monkey.
ORGANISM Saimiri boliviensis
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.
REFERENCE 1 (bases 1 to 646)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 646)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..646
/organism="Saimiri boliviensis"
/db_xref="taxon:27679"
gene <1..>646
/gene="SBO28"
CDS <1..>646
/gene="SBO28"
/codon_start=2
/product="olfactory receptor"
/translation="LADIGFTSTTVPRTIVNIQTHSRVIAYASCLTQMSFSIFFACME
DTLLAVMAYDRFVAICHPLHYPVIMNPRLCGFLVLVSVFLSLLISQVHNLIVLQFSCF
KEIKISNFFCDPSQLLTLSCSDTFVNNIVTNFFAAVFGFLPISGIFFSYYKIAPSILR
VPLSSGKYKAFSTCSSHLAVVCLFYGTVIGVYLGSSMASPRKSVVASVMYTVVTP" (SEQ ID
NO:129).
BASE COUNT 137 a 167 c 122 g 220 t
ORIGIN
1 cttggctgac attggtttca cctccaccac agtccccagg acaattgtga acattcaaac
61 tcacagcaga gtcatcgcct atgcgagctg cctgacacag atgtcttttt caatattttt
121 tgcgtgtatg gaagacacgc tcctggctgt gatggcctat gaccggtttg ttgccatctg
181 tcacccccctg cactacccag tcatcatgaa cccacgactc tgtggcttct tagtgttggt
241 gtctgttttt cttagccttt taatatccca ggtgcacaat ttgattgtct tacaattttc
301 ttgcttcaaa gagataaaga tttctaattt cttctgtgac ccttctcaac tcctcaccct
361 ttcttgttct gacacctttg tcaataacat agtcacgaat ttctttgctg ctgtatttgg
421 ttttcttccc atctcaggga tctttttctc ttactataaa attgcccccct ccattctgag
481 agttccatta tcaagtggga agtataaagc cttctccacc tgtagctctc acctggcagt
541 tgtttgctta ttttatggaa cagtcattgg agtgtacctt gggtcatcaa tggcatcccc
601 caggaagagt gtggtggcct cagtgatgta cacagtggtc actccc (SEQ ID NO:128).

OR86

LOCUS AF127899 649 bp DNA PRI 28-FEB-2000
DEFINITION Saimiri boliviensis olfactory receptor (SBO29) gene, partial cds.
ACCESSION AF127899

KEYWORDS .
SOURCE Bolivian squirrel monkey.
ORGANISM Saimiri boliviensis
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..649
/organism="Saimiri boliviensis"
/db_xref="taxon:27679"
gene <1..>649
/gene="SBO29"
CDS <1..>649
/gene="SBO29"
/codon_start=2
/product="olfactory receptor"
/translation="FVDICFVSTTVPKMLVNIQTHSKVITFAGCITQIGHCLLFAALD
IFMLTVMAYDRYVAICHPLHYTVTINPRLCGLLVLASWILSALNSSLQTLIVLRLSFC
TDLEIPRFFCELNQVIHLACYDTFLNDVVMYLAAMLLGGGPLTGIIYSYSKIVSSIRA
ISSAQGKYKAFSTCASHILIVSLFYGTLLGVYLSSAATGNSHSGAAALVMYTVVTP" (SEQ ID
NO:131).
BASE COUNT 138 a 177 c 133 g 201 t
ORIGIN
1 ctttgtagac atctgttttg tgtctaccac tgtcccgaag atgctggtaa atatccagac
61 acacagcaaa gtcatcacct ttgcaggctg catcacccag ataggccatt gcctactctt
121 tgcagcattg gacatcttta tgctgactgt gatggcctat gaccggtatg tggccatctg
181 tcacccccctg cactacacag tcaccattaa ccccagactg tgtggactgc tggttctggc
241 atcctggatc ctgagtgccc tgaattcctc attacaaacc ttaatagtgc tgcggctttc
301 cttctgcaca gacttggaaa tccccccgctt tttctgcgaa cttaatcagg tcatacatct
361 tgcctgttat gacactttcc ttaatgatgt ggtgatgtat ttggcagcta tgctgctggg
421 cggtggtccc ctcacaggaa ttatttactc ttactctaag atagtttcct ccatacgtgc
481 aatctcatca gctcagggga agtacaaggc gttttccacc tgtgcatctc acatcttaat
541 tgtctcctta ttttatggta cactcctagg tgtgtacctt agttctgctg caactggcaa
601 ctcacattca ggtgctgcag ccttggtgat gtacactgtg gtcaccccc (SEQ ID NO:130).

OR87

LOCUS AF127900 649 bp DNA PRI 28-FEB-2000
DEFINITION Saimiri boliviensis olfactory receptor (SBO30) gene, partial cds.
ACCESSION AF127900
KEYWORDS .
SOURCE Bolivian squirrel monkey.
ORGANISM Saimiri boliviensis
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.
REFERENCE 1 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..649
/organism="Saimiri boliviensis"
/db_xref="taxon:27679"
gene <1..>649
/gene="SBO30"
CDS <1..>649
/gene="SBO30"
/codon_start=2
/product="olfactory receptor"
/translation="FVDICFVSTTVPKMLVNIQTHSKVITFADCITQIGHCLLFAALD
IFMLTVMAYDRYVATCHPLHYTVTINPRLCGLLVLASWILSALNSSLQPLIVLRLSFC
TDLEIPHFFCELNQVIHLACYDTFLNDVVMYLAAMLLGGGPLTGIIYSYSKIVSSIRA
ISSAQGKYKAFSTCASHILIVSLFYGTLLGVYLSSAATGNSHSSAAALVMYTVVTP" (SEQ ID NO:133).
BASE COUNT 141 a 179 c 130 g 199 t
ORIGIN
1 ctttgtagac atctgttttg tgtctaccac tgtcccgaag atgctggtaa atatccagac
61 acacagcaaa gtcatcacct ttgcagactg catcacccag ataggccatt gcctactctt
121 tgcagcattg gacatcttta tgctgactgt gatggcctat gaccggtatg tggccacctg
181 tcacccccctg cactacacag tcaccattaa ccccagactg tgtggactgc tggttctggc
241 atcctggatc ctgagtgccc tgaattcctc attacaaccc ttaatagtgc tgcggctttc
301 cttctgcaca gacttggaaa tcccccactt tttctgcgaa cttaatcagg tcatacatct
361 tgcctgttat gacactttcc ttaatgatgt ggtgatgtat ttggcagcta tgctgctggg
421 cggtggtccc ctcacaggaa ttatttactc ttactctaag atagtttcct ccatacgtgc
481 aatctcatca gctcagggga agtacaaggc gttttccacc tgtgcatctc acatcttaat
541 tgtctcctta ttttatggta cactcctagg tgtgtacctt agttctgctg caactggcaa
601 ctcacattca agtgctgcag ccttggtgat gtacacagtg gtcaccccc (SEQ ID NO:132).

OR88

LOCUS AF127901 649 bp DNA PRI 28-FEB-2000
DEFINITION Saimiri sciureus olfactory receptor (SSC31) gene, partial cds.
ACCESSION AF127901
KEYWORDS .
SOURCE common squirrel monkey.
ORGANISM Saimiri sciureus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia; Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..649
/organism="Saimiri sciureus"
/db_xref="taxon:9521"
gene <1..>649
/gene="SSC31"
CDS <1..>649
/gene="SSC31"
/codon_start=2
/product="olfactory receptor"
/translation="FVDICFVSTTVPKMLVNIQTHSKVITFAGCITQIGHCLLFAALD
IFMLTVMAYDRYVAICHPLHYTVTINPRLCGLLVLASWILSALNSSLQTLIVLRLSFC
TDLEIPHFFCELNQVIHLACYDTFLNDVVMYLAAMLLGGGPLTGIIYSYSKIVSSIRA
ISSAQGKYKAFSTCASHILIVSLFYGTLLGVYLSSAATGNSHSSAAALVMHTVVTP" (SEQ ID NO:135).
BASE COUNT 141 a 178 c 131 g 199 t
ORIGIN
1 ctttgtagac atctgttttg tgtctaccac tgtcccgaag atgctggtaa atatccagac
61 acacagcaaa gtcatcacct ttgcaggctg catcacccag ataggccatt gcctactctt
121 tgcagcattg gacatcttta tgctgactgt gatggcctat gaccggtatg tggccatctg
181 tcacccccctg cactacacag tcaccattaa ccccagactg tgtggactgc tggttctggc
241 atcctggatc ctgagtgccc tgaattcctc attacaaacc ttaatagtgc tgcggctttc
301 cttctgcaca gacttggaaa tcccccactt tttctgcgaa cttaatcagg tcatacatct
361 tgcctgttat gacactttcc ttaatgatgt ggtgatgtat ttggcagcta tgctgctggg
421 cggtggtccc ctcacaggaa ttatttactc ttactctaag atagtttcct ccatacgtgc
481 aatctcatca gctcagggga agtacaaggc gttttccacc tgtgcatctc acatcttaat
541 tgtctcctta ttttatggta cactcctagg tgtgtacctt agttctgctg caactggcaa
601 ctcacattca agtgctgcag ccttggtgat gcacacagtg gtcaccccc (SEQ ID NO:134).

OR89

LOCUS AF127902 646 bp DNA PRI 28-FEB-2000
DEFINITION Saimiri sciureus olfactory receptor (SSC32) gene, partial cds.
ACCESSION AF127902
KEYWORDS .
SOURCE common squirrel monkey.
ORGANISM Saimiri sciureus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia; Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.
REFERENCE 1 (bases 1 to 646)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 646)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..646
/organism="Saimiri sciureus"

/db_xref="taxon:9521"
gene <1..>646
/gene="SSC32"
CDS <1..>646
/gene="SSC32"
/codon_start=2
/product="olfactory receptor"
/translation="LADIGFTSTTVPRTIVNIQTHSRVIAYASCLTQVSFSIFFACME
DTLLAVMAYDRFVAICHPLHYPVIMNPRLCGFLVLVSVFLSLLISQVHNLIVLQFSCF
KEIKISNFFCDPSQLLTLSCSDTFVNNIVTNFFAAVFGFLPISGIFFSYYKIASSILR
VPLSSGKYKAFSTCSSHLAVVCLFYGTVIGVYLGSSMASPRKSVVASVMYTVVTP" (SEQ ID NO:137).
BASE COUNT 135 a 166 c 123 g 222 t
ORIGIN
1 cttggctgac attggtttca cctccaccac agtccccagg acaattgtga acattcaaac
61 tcacagcaga gtcatcgcct atgcgagctg cctgacacag gtgtcttttt caatcttttt
121 tgcgtgtatg gaagacacgc tcctggctgt gatggcctat gaccggtttg ttgccatctg
181 tcacccccctg cactacccag tcatcatgaa cccacgactc tgtggcttct tagtgttggt
241 gtctgttttt cttagccttt taatatccca ggtgcacaat ttgattgtct tacaattttc
301 ttgcttcaaa gagataaaga tttctaattt cttctgtgac ccttctcaac tcctcaccct
361 ttcttgttct gacacctttg tcaataacat agtcacgaat ttctttgctg ctgtatttgg
421 ttttcttccc atctcaggga tctttttctc ttactataaa attgcctcct ccattctgag
481 agttccatta tcaagtggga agtataaagc cttctccacc tgtagctctc acctggcagt
541 tgtttgctta ttttatggaa cagttattgg agtgtacctt gggtcatcaa tggcatcccc
601 caggaagagt gtggtggcct cagtgatgta cacagtggtc actccc (SEQ ID NO:136).

OR90

LOCUS AF127903 649 bp DNA PRI 28-FEB-2000
DEFINITION Saimiri sciureus olfactory receptor (SSC33) gene, partial cds.
ACCESSION AF127903
KEYWORDS .
SOURCE common squirrel monkey.
ORGANISM Saimiri sciureus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..649
/organism="Saimiri sciureus"
/db_xref="taxon:9521"
gene <1..>649
/gene="SSC33"
CDS <1..>649
/gene="SSC33"
/codon_start=2

/product="olfactory receptor"
/translation="FSDLCFSSVTIPKLLQNMQSQDPSIPYAGCLTQMYFFLYFSDLE
SFLLVAMAYDRYVAICLPLHYATIMSPMLSRSLVALSWVLTTFHAMLHTLLMARLRFC
ADNVILHFFCDMSALLKLACSDTRVNELVIFIMGGLILVIPLLLIIGSYARIVFSILK
VPSSKGICKAVSTCGSHLSVVSLFYGTVIGLYLCPSANNSTLKETVMAVMYTVMAP" (SEQ ID NO:139).

BASE COUNT 115 a 192 c 134 g 208 t

ORIGIN

1 cttctctgac ctctgcttct cttctgtgac cattccaaag ttgttacaga acatgcagag
61 ccaagaccca tccatcccct atgcgggctg cctgacccag atgtacttct tcttgtattt
121 ttcggatcta gagagcttcc tccttgtggc catggcctat gaccgctacg tggccatctg
181 cctcccccta cattacgcca ccatcatgag ccccatgctg tctcgctccc tggtggcgct
241 gtcctgggtg ctgaccacct tccatgccat gttgcacact ttactcatgg ccaggttgcg
301 tttttgtgca gacaatgtga tcctccactt tttctgtgat atgtctgctc tgctgaagct
361 ggcctgctct gacactcgag ttaatgaatt ggtgatattt atcatgggag gcctcattct
421 tgtcatccca cttctactta tcattgggtc ctacgcacga attgtcttct ccatcctcaa
481 ggtcccttct tctaagggta tctgcaaggc cgtctctact tgtggctccc acctctctgt
541 ggtgtcactg ttctatggga ctgttattgg tctctactta tgcccatcag ctaataattc
601 tactctaaag gagactgtca tggctgtgat gtacactgtg atggcccccc (SEQ ID NO:138).

OR91

LOCUS AF127904 646 bp DNA PRI 28-FEB-2000
DEFINITION Saimiri sciureus olfactory receptor (SSC34) gene, partial cds.
ACCESSION AF127904
KEYWORDS .
SOURCE common squirrel monkey.
ORGANISM Saimiri sciureus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.
REFERENCE 1 (bases 1 to 646)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 646)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..646
/organism="Saimiri sciureus"
/db_xref="taxon:9521"
gene <1..>646
/gene="SSC34"
CDS <1..>646
/gene="SSC34"
/codon_start=2
/product="olfactory receptor"
/translation="LADIGFTSTTVPRTIVNIQTHSRVIAYASCLTQMSFSIFFACME
DTLLAVMAYDRFVAICHPLHYPVIMNPRLCGFLVLVSVFLSLLISQVHNLIVLQFSCF
KEIKISNFFCDPSQLLTLSCSDTFVNNIVTNFFAAVFGFLPISGIFFSYYKIASSILR
VPLSSGKYKAFSTCSSHLAVVCLFYGTVIGVYLGSSMASPRKSVVASVMYTVVTP" (SEQ ID NO:141).

BASE COUNT 136 a 167 c 122 g 221 t
ORIGIN
1 cttggctgac attggtttca cctccaccac agtccccagg acaattgtga acattcaaac
61 tcacagcaga gtcatcgcct atgcgagctg cctgacacag atgtcttttt caatcttttt
121 tgcgtgtatg gaagacacgc tcctggctgt gatggcctat gaccggtttg ttgccatctg
181 tcacccccctg cactacccag tcatcatgaa cccacgactc tgtggcttct tagtgttggt
241 gtctgttttt cttagccttt taatatccca ggtgcacaat ttgattgtct tacaattttc
301 ttgcttcaaa gagataaaga tttctaattt cttctgtgac ccttctcaac tcctcaccct
361 ttcttgttct gacacctttg tcaataacat agtcacgaat ttctttgctg ctgtatttgg
421 ttttcttccc atctcaggga tctttttctc ttactataaa attgcctcct ccattctgag
481 agttccatta tcaagtggga agtataaagc cttctccacc tgtagctctc acctggcagt
541 tgtttgctta ttttatggaa cagtcattgg agtgtacctt gggtcatcaa tggcatcccc
601 caggaagagt gtggtggcct cagtgatgta cacagtggtc actccc (SEQ ID NO:140).

OR92

LOCUS AF127905 649 bp DNA PRI 28-FEB-2000
DEFINITION Saimiri boliviensis SBO64 pseudogene, partial sequence.
ACCESSION AF127905
KEYWORDS .
SOURCE Bolivian squirrel monkey.
ORGANISM Saimiri boliviensis
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..649
/organism="Saimiri boliviensis"
/db_xref="taxon:27679"
gene <1..>649
/gene="SBO64"
/pseudo
BASE COUNT 145 a 157 c 129 g 218 t
ORIGIN
1 ctttgtcgat ttctgttatt ccaccaccgt tatacccaaa ctgctggaga acttggttgt
61 ggaagacaga agcatctcct tcacaggatg cgtcatgcaa ttctttttg ccagcatatt
121 tgtggtgaca gaaatattca tgctggcagt gatggcctat gacagatttg tggtggtgtg
181 ttaccctctg ctctacacag ttgcaatgtc ccagaggctt ttcttttgt tagtggctac
241 atcatacttc agggtgacag tctgtttctt gacaattacc ttctttctcc tggaattatc
301 cttcagagga aataatatca ttaataactt tgtgtgtgag cctgctgcca ttgttgctgt
361 gccatgcttt gacccctaca tgagccagga aatcattttc atttctgcca cattcaatga
421 aacaagcagc ctgatgatca ttctcacctc ctaagatttc gtttttatca atgtcatgat
481 gatgccttcc actgggggggc gcataaaagc atgcgcgacc tgttcctccc agctgaccgc
541 cattatcatt ttccatggga ccatctcttt tctctattgt gttcctaact ccaaaagttc
601 atggctcatg gtcaaggtgg gctctatctt ttacacagtg gtcatcccc (SEQ ID NO:142).

OR93

LOCUS AF127906 649 bp DNA PRI 28-FEB-2000
DEFINITION Saimiri boliviensis olfactory receptor (SBO65) gene, partial cds.
ACCESSION AF127906
KEYWORDS .
SOURCE Bolivian squirrel monkey.
ORGANISM Saimiri boliviensis
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..649
/organism="Saimiri boliviensis"
/db_xref="taxon:27679"
gene <1..>649
/gene="SBO65"
CDS <1..>649
/gene="SBO65"
/codon_start=2
/product="olfactory receptor"
/translation="FVDICVTSTTIPKTLSNIQTHSKVITYAGCVTQLYFSVLFIGLD
SLLLTVMAYDRFVAICHPLRYMVIMNPQLCGLLVLVSWIMSALHSLTESLMALSLLFC
TDLKILHFFCELNQIIHIACSDTCLNNLVMYLSAVLLGGGPLAGILYSYSKIASSIRA
ISSAKGKYKAFSTCASHLSVVSLFYCTGLGVYLSSAATHNSLSSTAASVMYTVVTP" (SEQ ID
NO:144).
BASE COUNT 141 a 180 c 130 g 198 t
ORIGIN
1 ctttgtagac atctgtgtta cctccaccac gattccaaag acactatcaa acatccagac
61 acacagcaaa gtcatcacct atgcaggctg tgtcacccag ttgtactttt ctgtactctt
121 tatagggttg gacagcttac tcctgaccgt gatggcctat gaccgatttg tggccatctg
181 tcacccccctg cgctacatgg tcatcatgaa ccctcagctc tgtggactgc tggttctggt
241 gtcctggatc atgagtgccc tgcattcctt gacagaaagc ttaatggcat tatcactgct
301 cttttgtaca gacttgaaaa tcctccactt tttctgtgaa cttaatcaga taatccacat
361 tgcctgttct gacacctgtc ttaataacct ggtgatgtat ttgtcagctg tgctgctggg
421 cggtggtcct ctcgctggga tcctgtactc ttactctaag atagcttcct ctatacgtgc
481 aatctcatca gctaagggga agtacaaggc attttccacc tgtgcatctc acctctcagt
541 tgtctcctta ttttattgta caggcctagg ggtgtacctg agttctgctg caacccacaa
601 ctcactctca agtacagcag cctcggtgat gtacactgtg gtcaccccc (SEQ ID NO:143).

OR94

LOCUS AF127907 649 bp DNA PRI 28-FEB-2000
DEFINITION Saimiri sciureus olfactory receptor (SSC69) gene, partial cds.
ACCESSION AF127907
KEYWORDS .

SOURCE common squirrel monkey.
ORGANISM Saimiri sciureus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..649
/organism="Saimiri sciureus"
/db_xref="taxon:9521"
gene <1..>649
/gene="SSC69"
CDS <1..>649
/gene="SSC69"
/codon_start=2
/product="olfactory receptor"
/translation="FVDICFVSTTVPKMLVNIQTHSKVITFAGCITQIGHCLLFAALD
IFMLTVMAYDRYVAICHPLHYTVTINPRLCGLLVLASWILSALNSSLQPLIVLRLSFC
TDLEIPHFFCELNQVIHLACYDTFLNDVVMYLAAMLLGGGPLTGIIYSYSKIVSSIRA
ISSAQGKYKAFSTCASHILIVSLFYGTLLGAYLSSAATGNSHSSAAALVMYTVVTP" (SEQ ID
NO:146).
BASE COUNT 139 a 179 c 131 g 200 t
ORIGIN
1 ctttgtagac atctgttttg tgtctaccac tgtcccgaag atgctggtaa atatccagac
61 acacagcaaa gtcatcacct ttgcaggctg catcacccag ataggccatt gcctactctt
121 tgcagcattg gacatcttta tgctgactgt gatggcctat gaccggtatg tggccatctg
181 tcacccccctg cactacacag tcaccattaa ccccagactg tgtggactgc tggttctggc
241 atcctggatc ctgagtgccc tgaattcctc attacaaccc ttaatagtgc tgcggctttc
301 cttctgcaca gacttggaaa tcccccactt tttctgcgaa cttaatcagg tcatacatct
361 tgcctgttat gacactttcc ttaatgatgt ggtgatgtat ttggcagcta tgctgctggg
421 cggtggtccc ctcacaggaa ttatttactc ttactctaag atagtttcct ccatacgtgc
481 aatctcatca gctcagggga agtacaaggc gttttccacc tgtgcatctc acatcttaat
541 tgtctcctta ttttatggta cactcctagg tgcgtacctt agttctgctg caactggcaa
601 ctcacattca agtgctgcag ccttggtgat gtacactgtg gtcacccccc (SEQ ID NO:145).

OR95

LOCUS AF179716 487 bp DNA PRI 31-DEC-2000
DEFINITION Papio hamadryas olfactory receptor (PPA133) gene, partial cds.
ACCESSION AF179716
KEYWORDS .
SOURCE baboon.
ORGANISM Papio hamadryas
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Papio.
REFERENCE 1 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Papio hamadryas"
/db_xref="taxon:9557"
gene <1..>487
/gene="PPA133"
CDS <1..>487
/gene="PPA133"
/codon_start=2
/product="olfactory receptor"
/translation="VAICFPLHYTAIMSPMLCLALVALSWVLTTFHAMLHTLLMARLC
FCADNVIPHFFCDMSALLKLACSDTRVNELVIFIMGGLILVIPFLLILGSYARIVSSI
LKVPSSKGICKAFSTCGSHLSVVSLFYGTIIGLYFCPSANSSTLKETVMAMMYTVVTP
ML" (SEQ ID NO:148).
BASE COUNT 82 a 141 c 107 g 157 t
ORIGIN
1 tgtggccatc tgcttccccc tgcactacac cgccatcatg agccccatgc tctgtctcgc
61 cctggtggcg ctgtcctggg tgctgaccac cttccatgcc atgttacaca ctttactcat
121 ggccaggttg tgtttttgtg cagacaatgt gatcccccac tttttctgtg atatgtctgc
181 tctgctgaag ctggcctgct ctgacactcg agtcaatgaa ttggtgatat ttatcatggg
241 agggctgatt cttgtcatcc cattcctact catccttggg tcctatgcac ggattgtctc
301 ctccatcctc aaggtccctt cgtctaaggg tatctgcaag gcgttctcta cttgtggctc
361 ccacctctct gtggtgtcac tgttctatgg gaccattatt ggtctctact tctgcccatc
421 agctaatagt tctactctaa aggagactgt tatggctatg atgtacactg tggtgacccc
481 catgctg (SEQ ID NO:147).

OR96

LOCUS AF179717 486 bp DNA PRI 31-DEC-2000
DEFINITION Papio hamadryas olfactory receptor (PPA134) gene, partial cds.
ACCESSION AF179717
KEYWORDS .
SOURCE baboon.
ORGANISM Papio hamadryas
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Papio.
REFERENCE 1 (bases 1 to 486)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 486)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR

1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..486
/organism="Papio hamadryas"
/db_xref="taxon:9557"
gene <1..>486
/gene="PPA134"
CDS <1..>486
/gene="PPA134"
/codon_start=2
/product="olfactory receptor"
/translation="VAICQPLHYSTLLSPWACMAMVGTSWLTGIITATTHAFLIFSLP
FPSRPIIPHFLCDILPVLRLASAGKHRSEISVMTATVVFIMIPFSLIVTSYIRILGAI
LAMASTQSRRKVFSTCSSHLLVVSLFFGTASITYIRPQAGSSVTTDRVLSVFYTVITP
ML" (SEQ ID NO:150).
BASE COUNT 85 a 181 c 97 g 123 t
ORIGIN
1 tgttgccatc tgccagcctc tgcactactc taccctcttg agcccatggg cctgcatggc
61 catggtgggc acctcctggc tcacaggcat catcacggcc accacccatg ccttcctcat
121 cttctctcta ccttttccca gccgcccaat catcccacac tttctctgtg acatcctgcc
181 agtactgagg ctggcaagtg ctgggaagca caggagcgag atctctgtga tgacagccac
241 tgtagtcttc attatgatcc ccttctctct gattgtcacc tcttacatcc gcatcctggg
301 agccatccta gcgatggcct ccacccagag ccgccgcaag gtcttctcca cctgctcctc
361 ccatctgctc gtggtctctc tcttctttgg aacagccagc atcacctaca tccggccgca
421 ggcaggctcc tctgttacca cagaccgcgt cctcagtgtg ttctacacgg tcatcacacc
481 catgct (SEQ ID NO:149).

OR97

LOCUS AF179718 487 bp DNA PRI 31-DEC-2000
DEFINITION Papio hamadryas PPA135 pseudogene, partial sequence.
ACCESSION AF179718
KEYWORDS .
SOURCE baboon.
ORGANISM Papio hamadryas
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Papio.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Papio hamadryas"
/db_xref="taxon:9557"
gene <1..>487
/gene="PPA135"
/pseudo

BASE COUNT 112 a 140 c 89 g 146 t
ORIGIN
1 tgtggacatc tgaagtccct tgcactaccc agtcatcatg aacgaaagaa cacgggccaa
61 actggctgct gcttcctggt tcccaggctt tcctgtagct actgtgcaga ccacgtggct
121 cttcagcttt ccattctgtg gcaccaacaa ggtgaaccac ttcttctgtg acagcccacc
181 tgtgctgaag ctggtctgtg tagacacagc actgtttgag atctacacca tcactggaac
241 cattctggtg gtcatgatcc cctgcttgct gatcttgtgt tcctacactc tcattgctgc
301 tgccatcctc aagatcccat cagctaaagg gaagcataaa gccttctcta cgtgatcctc
361 acatctcctt gttgtctctc ttttctatct atcattaaac ctcacatatt ttcagcctaa
421 atcaaataat tctcctgaaa gcaaaaagct gctatcattg ttctacactg ttgtgactcc
481 catgttg (SEQ ID NO:151).

OR98

LOCUS AF179719 482 bp DNA PRI 31-DEC-2000
DEFINITION Papio hamadryas PPA136 pseudogene, partial sequence.
ACCESSION AF179719
KEYWORDS .
SOURCE baboon.
ORGANISM Papio hamadryas
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Papio.
REFERENCE 1 (bases 1 to 482)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 482)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..482
/organism="Papio hamadryas"
/db_xref="taxon:9557"
gene <1..>482
/gene="PPA136"
/pseudo
BASE COUNT 91 a 151 c 96 g 144 t
ORIGIN
1 tgtggccatc tgccaccccc tctactatgt cacagccatg agtcctggac tctgtatctt
61 gctcctctgc ttgtgttggg ggctctctgt tctctatggt ctcctcctca ctctcctcct
121 gaccagggtg accttctgtg ggactcaaga gatccactac ctcttctgtg agatgtacgt
181 cctgctgcag ctggcatgtt ccaacaccca catcattcac acagtgctgg ttgctactgg
241 ctgctttctt cctcgacccc ttagggttca cgactacatc ctatatacgt attgtcagaa
301 ccatccttca gataccctca gcctctaaga aacacaaaac cttctctgcc tgtgcctcac
361 atttgggtgt ggtctccctc ttttatggga cacttgttat ggtatacctg cagcccctcc
421 acacctactc catgaaggac tcagtagcca cagtgatgta tgctgtggtg acacctatga
481 tg (SEQ ID NO:152).

OR99

LOCUS AF179720 481 bp DNA PRI 31-DEC-2000

DEFINITION Papio hamadryas olfactory receptor (PPA137) gene, partial cds.
ACCESSION AF179720
KEYWORDS .
SOURCE baboon.
ORGANISM Papio hamadryas
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Papio.
REFERENCE 1 (bases 1 to 481)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 481)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..481
/organism="Papio hamadryas"
/db_xref="taxon:9557"
gene <1..>481
/gene="PPA137"
CDS <1..>481
/gene="PPA137"
/codon_start=2
/product="olfactory receptor"
/translation="LAICQPLRYPVLMNGRLCTVLVAGAWVAGSIHGSIQATLTFRLP
YCGPNQVDYFICDIPAVLRLACADTTVNELVTFVDIGVVAASCFMLILLSYANIVHAI
LKIRTTDGRRRAFSTCGSHLTVVTVYYVPCIFIYLRAGSKSPLDGAVAVFYTVVTPFL" (SEQ
ID NO:154).
BASE COUNT 89 a 139 c 116 g 137 t
ORIGIN
1 cctggcaata tgtcaacccc tgcgctaccc agtgctcatg aatgggaggt tatgcacagt
61 ccttgtggct ggagcttggg tcgccggctc cattcatggg tctatccagg ccaccctgac
121 cttccgccta ccctattgtg ggcccaatca ggtagattac tttatctgtg acatccctgc
181 agtattgaga ctggcctgtg ctgacacaac tgtcaatgag cttgtgacct ttgtggacat
241 cggagtagtg gccgccagtt gcttcatgtt aattctactt tcctatgcca acatagtcca
301 tgccatcctg aagatacgca ccactgatgg gaggcgccgg gccttctcta cctgtggctc
361 ccacctaact gtggtcacag tctactatgt tccctgtatt ttcatctacc ttagggctgg
421 ctccaagagc cccctggatg gggcagtggc tgtgttttac actgttgtca ctccattcct
481 g (SEQ ID NO:153).

OR100

LOCUS AF179721 487 bp DNA PRI 31-DEC-2000
DEFINITION Papio hamadryas olfactory receptor (PPA138) gene, partial cds.
ACCESSION AF179721
KEYWORDS .
SOURCE baboon.
ORGANISM Papio hamadryas
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Papio.

REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Papio hamadryas"
/db_xref="taxon:9557"
gene <1..>487
/gene="PPA138"
CDS <1..>487
/gene="PPA138"
/codon_start=2
/product="olfactory receptor"
/translation="VAICKPLLYPVIMTNGLCIRLLVLSFVGGFLHALIHEGILFRLT
FCNSNIIHHFYCDIIPLLTISCTDPSINFLMLFILSGSIQVFTILTVLVSYAFVLFTI
LKKKSVKGIRKAFSTCGAHLFSVCLYYGPLLFMYVGPASPQADDQDMVECVFYTVIIP
FL" (SEQ ID NO:156).
BASE COUNT 117 a 106 c 74 g 190 t
ORIGIN
1 tgtagccata tgcaaacctt tactttatcc agtgattatg accaatggac tgtgcatccg
61 gctattagtc ttgtcatttg taggtggctt ccttcatgcc ttaattcatg aaggcatttt
121 attcagatta accttctgta attctaacat aatacatcac ttttactgtg acattatccc
181 attgttaacg atttcctgta ctgacccttc tattaatttt ttaatgcttt ttattttgtc
241 tggttcaata caggtattca ctattttgac tgttcttgtc tcttatgcat ttgtcctctt
301 tacaatctta aaaaaaaagt cagtcaaagg cataaggaaa gccttttcca cctgtggagc
361 ccatctcttc tctgtctgtt tatactatgg ccccccttctc ttcatgtatg tgggccctgc
421 atctccacaa gcagatgatc aagatatggt agagtgtgta ttttacactg tcatcattcc
481 tttctta (SEQ ID NO:155).

OR101

LOCUS AF179722 487 bp DNA PRI 31-DEC-2000
DEFINITION Papio hamadryas olfactory receptor (PPA139) gene, partial cds.
ACCESSION AF179722
KEYWORDS .
SOURCE baboon.
ORGANISM Papio hamadryas
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Papio.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Papio hamadryas"
/db_xref="taxon:9557"
gene <1..>487
/gene="PPA139"
CDS <1..>487
/gene="PPA139"
/codon_start=2
/product="olfactory receptor"
/translation="VAICNPLLYMVVVSRRLCLLLVSLTYLYGFSTAIVVSPCIFSMS
YCSSNIINHFYCDIAPLLALSCSDTYLPEAIVFISAATNLVFSMITVLVSYFNIVLSI
LRMHSSEGRKKAFSTCASHMMAVTVFYGTMLFMYLQPQTNHSLDTDKMASVFYTLVIP
ML" (SEQ ID NO:158).
BASE COUNT 110 a 111 c 85 g 181 t
ORIGIN
1 tgtggccatt tgtaaccctc tgctctacat ggtggtggtg tctcggcggc tctgcctcct
61 gctggtctcc ctcacatacc tctatggctt ttctacagct attgtggttt caccttgtat
121 attctctatg tcttattgct cttctaatat aatcaatcat ttttactgtg atattgcacc
181 tctgttagca ttatcttgct ctgatactta cttaccagaa gcaatagtct tcatatctgc
241 agcaacaaat ttggtttttt ccatgattac agttctagta tcttatttca atattgtttt
301 gtccattcta aggatgcatt catcagaagg aaggaaaaaa gccttttcca cctgtgcttc
361 acatatgatg gcagtcacag ttttctatgg gacaatgctg ttcatgtatt tgcagcccca
421 aaccaaccac tcactggata ctgataagat ggcttctgtg ttttacacat tggtgattcc
481 tatgctg (SEQ ID NO:157).

OR102

LOCUS AF179723 487 bp DNA PRI 31-DEC-2000
DEFINITION Papio hamadryas olfactory receptor (PPA140) gene, partial cds.
ACCESSION AF179723
KEYWORDS .
SOURCE baboon.
ORGANISM Papio hamadryas
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Papio.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Papio hamadryas"
/db_xref="taxon:9557"
gene <1..>487
/gene="PPA140"

CDS <1..>487
/gene="PPA140"
/codon_start=2
/product="olfactory receptor"
/translation="VAICFPLHYTAIMSPMLCLALVALSWVLTTFHAMLHTLLMARLC
FCADNVIPHFFCDMSALLKLACSDTRVNELVIFIMGGLILVIPFLLILGSYARIVSSI
LKVPSSKGICKAFSTCGSHLSVVSLFYGTIIGLYFCPSANSSTLKETVMGMMYTVVTP
ML" (SEQ ID NO:160).

BASE COUNT 82 a 141 c 108 g 156 t

ORIGIN

1 tgtggccatc tgcttccccc tgcactacac cgccatcatg agccccatgc tctgtctcgc
61 cctggtggcg ctgtcctggg tgctgaccac cttccatgcc atgttacaca ctttactcat
121 ggccaggttg tgtttttgcg cagacaatgt gatcccccac tttttctgtg atatgtctgc
181 tctgctgaag ctggcctgct ctgacactcg agtcaatgaa ttggtgatat ttatcatggg
241 agggctgatt cttgtcatcc cattcctact catccttggg tcctatgcac ggattgtctc
301 ctccatcctc aaggtccctt cgtctaaggg tatctgcaag gcgttctcta cttgtggctc
361 ccacctctct gtggtgtcac tgttctatgg gaccattatt ggtctctact tctgcccatc
421 agctaatagt tctactctaa aggagactgt tatgggtatg atgtacactg tggtgacccc
481 catgctg (SEQ ID NO:159).

OR103

LOCUS AF179724 478 bp DNA PRI 31-DEC-2000
DEFINITION Papio hamadryas olfactory receptor (PPA142) gene, partial cds.
ACCESSION AF179724
KEYWORDS .
SOURCE baboon.
ORGANISM Papio hamadryas
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Papio.
REFERENCE 1 (bases 1 to 478)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 478)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..478
/organism="Papio hamadryas"
/db_xref="taxon:9557"
gene <1..>478
/gene="PPA142"
CDS <1..>478
/gene="PPA142"
/codon_start=2
/product="olfactory receptor"
/translation="VAICKPLNYATIMSQPMCGFLMGVAGILGFVHGGIQTLFIAQLP
FCGPNVIDHFMCDLVPLLELACTDTHTLGPLIAANSGSLCFLIFSMLVASYVIILCSL
RTHISEGRHKALSSCTSHIFVVILFFVPCSYLYLRPLTSFPTDKAVTVFCTLFTPML"
(SEQ ID NO:162).

BASE COUNT 93 a 126 c 98 g 161 t
ORIGIN
1 tgtggccatc tgtaagccct tgaactatgc aaccatcatg agtcaaccta tgtgtggatt
61 cctgatgggg gtggctggga ttctgggatt tgtgcatgga gggatccaga ctctgttcat
121 agcccagtta ccattctgtg gccccaatgt catcgaccac tttatgtgtg atttagtacc
181 tcttctagag ctggcctgca cagacactca caccttgggg cctctgatag ctgccaacag
241 tggatcattg tgtttcctca ttttttccat gctggttgct tcctatgtca tcatcctgtg
301 ctccctaagg actcatatct ctgaagggcg tcacaaagct ctgtctagtt gtacctctca
361 tatctttgtt gtcatcttat tctttgtccc ttgttcatac ctgtatctaa gacctctaac
421 ctccttcccc actgacaaag ctgtgactgt gttttgcacc ctatttacac ctatgttg (SEQ ID NO:161).

OR104

LOCUS AF179725 487 bp DNA PRI 31-DEC-2000
DEFINITION Papio hamadryas olfactory receptor (PPA143) gene, partial cds.
ACCESSION AF179725
KEYWORDS .
SOURCE baboon.
ORGANISM Papio hamadryas
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Papio.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Papio hamadryas"
/db_xref="taxon:9557"
gene <1..>487
/gene="PPA143"
CDS <1..>487
/gene="PPA143"
/codon_start=2
/product="olfactory receptor"
/translation="VAICKPLHYLNIMNRRVCTLLVFTSWLVSFLIIFPALMLLLQLD
YCRSNIMDHFTCDYFPLLQLACSDTKFLEVMGFSCAVFTLMLTLALIFLSYIYIIRTI
LRIPSASQRTKAFSTCSSHMIVISISYGSCIFMYIKPSAKDRVSLSKGVAILNTSVAP
ML" (SEQ ID NO:164).
BASE COUNT 120 a 110 c 85 g 172 t
ORIGIN
1 tgtggccatc tgcaagcctc tgcattactt gaatatcatg aatcgaagag tctgcacact
61 gcttgttttt acttcttggc tggtttcatt cttaatcata ttcccagcac tcatgttgct
121 cttacagctt gattactgta ggtctaatat tatggaccat tttacctgtg attattttcc
181 cctgctgcaa cttgcttgtt cagacacaaa attcctagag gtgatgggat tttcttgtgc
241 tgtgtttact ctaatgttga ctttggcatt aatatttctg tcctacatat acattatcag
301 aacaattttg agaattcctt ctgctagtca aaggacaaag gccttttcca catgttcttc
361 ccacatgatt gtcatctcca tctcttatgg cagctgcatt tttatgtaca ttaaaccctc

421 agcaaaagat agagtgtcct tgagcaaggg agtggcaata ctaaacacct cagtagcccc
481 catgctg (SEQ ID NO:163).

OR105

LOCUS AF179726 487 bp DNA PRI 31-DEC-2000
DEFINITION Papio hamadryas olfactory receptor (PPA144) gene, partial cds.
ACCESSION AF179726
KEYWORDS .
SOURCE baboon.
ORGANISM Papio hamadryas
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Papio.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Papio hamadryas"
/db_xref="taxon:9557"
gene <1..>487
/gene="PPA144"
CDS <1..>487
/gene="PPA144"
/codon_start=2
/product="olfactory receptor"
/translation="VAICQPLHYSTLLSPWACMAMVGTSWLTGIITATTHAFLIFSLP
FPSRPIIPHFLCDILPVLRLASAGKHRSEISVMTATVVFIMIPFSLIVTSYIRILGAI
LAMASTQSRRKVFSTCSSHLLVVSLFFGTASITYIRPQAGSSVTTDRVLSLFYTVITP
ML" (SEQ ID NO:166).
BASE COUNT 85 a 184 c 95 g 123 t
ORIGIN
1 tgttgccatc tgccagcctc tgcactactc taccctcttg agcccatggg cctgcatggc
61 catggtgggc acctcctggc tcacaggcat catcacggcc accacccatg ccttcctcat
121 cttctctcta ccttttccca gccgcccaat catcccacac tttctctgtg acatcctgcc
181 agtactgagg ctggcaagtg ctgggaagca caggagcgag atctctgtga tgacagccac
241 tgtagtcttc attatgatcc ccttctctct gattgtcacc tcttacatcc gcatcctggg
301 agccatccta gcgatggcct ccacccagag ccgccgcaag gtcttctcca cctgctcctc
361 ccatctgctc gtggtctctc tcttctttgg aacagccagc atcacctaca tccggccgca
421 ggcaggctcc tctgttacca cagaccgcgt cctcagtctc ttctacacgg tcatcacacc
481 catgctc (SEQ ID NO:165).

OR106

LOCUS AF179727 487 bp DNA PRI 31-DEC-2000
DEFINITION Pan troglodytes olfactory receptor (PTR183) gene, partial cds.
ACCESSION AF179727

KEYWORDS .
SOURCE chimpanzee.
ORGANISM Pan troglodytes
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pan.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Pan troglodytes"
/db_xref="taxon:9598"
gene <1..>487
/gene="PTR183"
CDS <1..>487
/gene="PTR183"
/codon_start=2
/product="olfactory receptor"
/translation="VAICFPLHYTAIMSPMLCLSVVTLSWVLTTFHAMLHTLLMARLC
FCADNVIPHFFCDMSALLKLACSDTRVNEWVIFIMGGLIVVIPFLLILGSYARIVSSI

LKVPSSKGICKALSTCGSHLSVVSLFYGTVIGLYLCPSANSSTLKDTVMAMMYTVVTP
ML" (SEQ ID NO:168).
BASE COUNT 86 a 137 c 105 g 159 t
ORIGIN
1 tgtggccatc tgtttccccc tgcactacac cgccatcatg agccccatgc tctgtctctc
61 cgtggtgacg ctgtcctggg tgctgaccac cttccatgcc atgttacaca ctttactcat
121 ggccaggttg tgtttttgtg cagacaatgt gatcccccac tttttctgtg atatgtctgc
181 tctactgaag ctggcctgct ctgacactcg agttaatgaa tgggtgatat ttatcatggg
241 agggctcatt gttgtcatcc cattcctact catccttggg tcctatgcaa gaattgtctc
301 ctccatcctc aaggtccctt cttctaaggg tatctgcaag gccttgtcta cttgtggctc
361 ccacctgtct gtggtgtcac tgttctatgg gaccgttatt ggtctctact tatgcccatc
421 agctaatagt tctactctaa aggacactgt catggctatg atgtacactg tggtgacccc
481 catgctg (SEQ ID NO:167).

OR107

LOCUS AF179728 487 bp DNA PRI 31-DEC-2000
DEFINITION Pan troglodytes olfactory receptor (PTR203) gene, partial cds.
ACCESSION AF179728
KEYWORDS .
SOURCE chimpanzee.
ORGANISM Pan troglodytes
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pan.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:

Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Pan troglodytes"
/db_xref="taxon:9598"
gene <1..>487
/gene="PTR203"
CDS <1..>487
/gene="PTR203"
/codon_start=2
/product="olfactory receptor"
/translation="VAICFPLHYTAIMSPMLCLSVVALSWVLTTFHAMLHTLLMARLC
FCADNVIPHFFCDMSALLKLACSDTRVNEWVIFIMGGLIVVIPFLLILGSYARIVSSI
LKVPSSKGICKALSTCGSHLSVVSLFYGTVIGLYLCPSANSSTLKDTVMAMMYTVVTP
ML" (SEQ ID NO:170).
BASE COUNT 85 a 137 c 106 g 159 t
ORIGIN
1 tgtggccatc tgtttccccc tgcactacac cgccatcatg agccccatgc tctgtctctc
61 cgtggtggcg ctgtcctggg tgctgaccac cttccatgcc atgttacaca ctttactcat
121 ggccaggttg tgtttttgtg cagacaatgt gatcccccac tttttctgtg atatgtctgc
181 tctactgaag ctggcctgct ctgacactcg agttaatgaa tgggtgatat ttatcatggg
241 agggctcatt gttgtcatcc cattcctact catccttggg tcctatgcaa gaattgtctc
301 ctccatcctc aaggtcccct cttctaaggg tatctgcaag gccttgtcta cttgtggctc
361 ccacctgtct gtggtgtcac tgttctatgg gaccgttatt ggtctctact tatgcccatc
421 agctaatagt tctactctaa aggacactgt catggctatg atgtacactg tggtgacccc
481 catgctg (SEQ ID NO:169).

OR108

LOCUS AF179729 485 bp DNA PRI 31-DEC-2000
DEFINITION Pan troglodytes PTR204 pseudogene, partial sequence.
ACCESSION AF179729
KEYWORDS .
SOURCE chimpanzee.
ORGANISM Pan troglodytes
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia; Eutheria; Primates; Catarrhini; Hominidae; Pan.
REFERENCE 1 (bases 1 to 485)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse: Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 485)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers

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                     /db_xref="taxon:9598"
     gene            <1..>485
                     /gene="PTR204"
                     /pseudo
BASE COUNT     130 a    107 c     77 g    171 t
ORIGIN
        1 tgtagccata tgtaatccct tgctttatcc agtgatgatg tccaacaaac tcagcgctca
       61 gttgctaagc atttcatatg taattggttt cctgcatcct ctggttcatg tgagtttact
      121 attgcgacta actttctgca ggtttaacat aatacattat ttctactgtg aaattttaca
      181 actgttcaaa atttcatgca atggtccatc tattaacgca ctaatgatat ttatttttgg
      241 tgcttttata caaataccca ctttaatgac gatcataatc tcttatactc gtgtgctctt
      301 tgatattctg aaaaaaaagt ctgaaaaggg cagaagcaaa gccttctcca catgcagcgc
      361 ccatctgctt tctgtctcat tgtactacgg aactctgatc ttcatgtatg tgcgtcctgc
      421 atctggctta gctgaagacc cagacaaagt gtattctctt ttacacgatt ataattcccc
      481 tgcta  (SEQ ID NO:171).
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OR109

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LOCUS       AF179730     487 bp   DNA          PRI     31-DEC-2000
DEFINITION  Pan troglodytes olfactory receptor (PTR205) gene, partial cds.
ACCESSION   AF179730
KEYWORDS    .
SOURCE      chimpanzee.
  ORGANISM  Pan troglodytes
            Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
            Eutheria; Primates; Catarrhini; Hominidae; Pan.
REFERENCE   1  (bases 1 to 487)
  AUTHORS   Giorgi,D.G. and Rouquier,S.P.
  TITLE     The olfactory receptor gene repertoire in primates and mouse:
            Evidence for reduction of function in primates
  JOURNAL   Unpublished
REFERENCE   2  (bases 1 to 487)
  AUTHORS   Giorgi,D.G. and Rouquier,S.P.
  TITLE     Direct Submission
  JOURNAL   Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
            1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES             Location/Qualifiers
     source          1..487
                     /organism="Pan troglodytes"
                     /db_xref="taxon:9598"
     gene            <1..>487
                     /gene="PTR205"
     CDS             <1..>487
                     /gene="PTR205"
                     /codon_start=2
                     /product="olfactory receptor"
                     /translation="VAICRPLCYSTVTRPQVCALMLALCWVLTNIIALTHTFLMARLS
                     FCVTGEIAHFFCDITPVLKLSCSDTHINEMMVFVLGGTVLIVPFLCIVTSYIHIVPAI
                     LRVRTRGGVGKAFSTCSSHLCVVCVFYGTLFSAYLCPPSIASEEKDIAAAAMYTIVTP
                     ML"  (SEQ ID NO:173).
BASE COUNT     83 a    148 c    110 g    146 t
ORIGIN
        1 tgtggccatt tgccgccccc tctgctactc cacagtcacg aggccccaag tctgtgccct
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61 aatgcttgca ttgtgctggg tcctcaccaa tatcattgcc ctgactcaca cgttcctcat
121 ggctcggttg tccttctgtg tgactgggga aattgctcac tttttctgtg acatcactcc
181 tgtcctgaag ctgtcatgtt ctgacaccca catcaacgag atgatggttt ttgtcttggg
241 aggcaccgta ctcatcgtcc ccttttttatg cattgtcacc tcctacatcc acattgtgcc
301 agctatcctg agggtccgaa cccgtggtgg ggtgggcaag gccttttcca cctgcagttc
361 ccacctctgc gttgtttgtg tgttctatgg gacgctcttc agtgcctacc tgtgtcctcc
421 ctccattgcc tctgaagaga aggacattgc agcagctgca atgtacacca tagtgactcc
481 catgttg (SEQ ID NO:172).

OR110

LOCUS AF179731 487 bp DNA PRI 31-DEC-2000
DEFINITION Pan troglodytes olfactory receptor (PTR206) gene, partial cds.
ACCESSION AF179731
KEYWORDS .
SOURCE chimpanzee.
ORGANISM Pan troglodytes
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pan.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Pan troglodytes"
/db_xref="taxon:9598"
gene <1..>487
/gene="PTR206"
CDS <1..>487
/gene="PTR206"
/codon_start=2
/product="olfactory receptor"
/translation="VAICHPLHYSTIMALRLCASLVAAPWVIAILNPLLHTLMMAHLH
FCSDNVIHHFFCDINSLLPLSCSNTSLNQLSVLATVGLIFVVPSVCILVSYILIVSAV

MKVPSAQGKLKAFSICGSHLALVILFYGAITGVYMSPLSNHSTEKDSAASVIFMVVAP
VL" (SEQ ID NO:175).
BASE COUNT 90 a 138 c 91 g 168 t
ORIGIN
1 cgtggccatc tgtcaccctt tacattactc caccattatg gccctgcgcc tctgtgcctc
61 tctggtagct gcaccttggg tcattgccat tttgaaccct ctcttgcaca ctcttatgat
121 ggcccatctg cacttctgct ctgataatgt tatccaccat ttcttctgtg atatcaactc
181 tctcctccct ctgtcctgtt ccaacaccag tcttaatcag ttgagtgttc tggctacggt
241 ggggctgatc tttgtggtac cttcagtgtg tatcctggta tcctatatcc tcattgtttc
301 tgctgtgatg aaagtccctt ctgcccaagg aaaactcaag gctttctcta tctgtggatc
361 tcaccttgcc ttggtcattc ttttctatgg agcaatcaca ggggtctata tgagcccctt
421 atccaatcac tctactgaaa aagactcagc cgcatcagtc atttttatgg ttgtagcacc
481 tgtgttg (SEQ ID NO:174).

OR111

LOCUS AF179732 487 bp DNA PRI 31-DEC-2000
DEFINITION Pan troglodytes olfactory receptor (PTR207) gene, partial cds.
ACCESSION AF179732
KEYWORDS .
SOURCE chimpanzee.
ORGANISM Pan troglodytes
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pan.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Pan troglodytes"
/db_xref="taxon:9598"
gene <1..>487
/gene="PTR207"
CDS <1..>487
/gene="PTR207"
/codon_start=2
/product="olfactory receptor"
/translation="VAVCNPLLYTVAMYQRLCSLLVATSYCWGRVCSLTLTYFLLELS
FRGNNIINNFVCEHAAIVAVSCSDPYVSQEITLVSATFNEISSLVITLTSYAFIFITV
MKTASIGGRKKAFFTCASHLTAITIFHGTILFLYCVPNSKSSWLMVKVASVFYTVVIP
ML" (SEQ ID NO:177).
BASE COUNT 99 a 122 c 103 g 163 t
ORIGIN
1 tgtggcggtg tgtaaccctc ttctctacac agttgcaatg taccagaggc tttgctcctt
61 gttggtggct acatcatact gttgggggag agtctgttcc ctgacactta cctactttct
121 actggaatta tccttcagag gaaataatat cattaataac tttgtctgtg agcatgctgc
181 cattgttgct gtgtcttgct ctgaccccta tgtgagccag gagatcactt tagtttctgc
241 cacattcaat gaaataagca gcctggtgat cactctcact tcctatgctt tcatttttat
301 cactgtcatg aagacggctt ccattggggg gcgcaagaaa gcgttcttca cgtgtgcctc
361 ccacttgacg gccattacca ttttccatgg gactattctt ttcctctact gtgttcctaa
421 ctccaaaagt tcgtggctca tggtcaaggt ggcctctgtc ttttacacag tggtcattcc
481 catgctg (SEQ ID NO:176).

OR112

LOCUS AF179733 481 bp DNA PRI 31-DEC-2000
DEFINITION Pan troglodytes olfactory receptor (PTR208) gene, partial cds.
ACCESSION AF179733
KEYWORDS .
SOURCE chimpanzee.
ORGANISM Pan troglodytes

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pan.
REFERENCE 1 (bases 1 to 481)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 481)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..481
/organism="Pan troglodytes"
/db_xref="taxon:9598"
gene <1..>481
/gene="PTR208"
CDS <1..>481
/gene="PTR208"
/codon_start=2
/product="olfactory receptor"
/translation="LAICQPLRYPVLMNGRLCTVLVAGACVAGSMHGSIQATLTFRLP

YCGPNQVDYFICDIPAVLRLACADTTVNELVTFVDVGVVAASCFMLILLSYANIVNAI

LKIRTTDGRHRAFSTCGSHLIVVTVYYVPCIFIYLRAGSKGPLDGAAAVFYTVVTPLL" (SEQ ID NO:179).
BASE COUNT 85 a 141 c 124 g 131 t
ORIGIN
1 cctggcaata tgtcagcccc tgcgctaccc agtgctcatg aatgggaggt tatgcacagt
61 ccttgtggct ggagcttgtg tcgccggctc catgcatggg tctatccagg ccaccctgac
121 cttccgcctg ccctactgtg ggcccaatca ggtggattac tttatctgtg acatccccgc
181 agtattgaga ctggcctgtg ctgacacaac tgtcaatgag cttgtgacct ttgtggacgt
241 cggggtggtg gccgccagtt gcttcatgtt aattctgctc tcgtatgcca acatagtaaa
301 tgccatcctg aagatacgca ccactgatgg gaggcaccgg gccttctcca cctgtggctc
361 ccacctaatc gtggtcacag tctactatgt cccctgtatt ttcatctacc ttagggctgg
421 ctccaaaggc cccctggatg gggcggcggc tgtgttttac actgttgtca ctccattact
481 g (SEQ ID NO:178).

OR113

LOCUS AF179734 487 bp DNA PRI 31-DEC-2000
DEFINITION Pan troglodytes olfactory receptor (PTR209) gene, partial cds.
ACCESSION AF179734
KEYWORDS .
SOURCE chimpanzee.
ORGANISM Pan troglodytes
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pan.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Pan troglodytes"
/db_xref="taxon:9598"
gene <1..>487
/gene="PTR209"
CDS <1..>487
/gene="PTR209"
/codon_start=2
/product="olfactory receptor"
/translation="VAICHPLYYRVIVNPRLCGLLVLVSWFLSLSYSLIQSLLMLQVS
FCTSWVIQHFYCELAQVLTLTCSDTHVNYILLYVVTGLLDFVPFSGILFSYTQIVSYI

LRISSTDGKHKAFSTCGSHLFVVSLFYGTGLGVYLSSNASSSSWWGMVASVMYTVVTP
ML" (SEQ ID NO:181).
BASE COUNT 79 a 144 c 107 g 157 t
ORIGIN
1 cgtggccatc tgtcaccccc tgtactaccg tgtcatcgtg aacccccgcc tctgtggcct
61 gctggttctt gtgtcctggt tcctcagctt gtcatactcc ctgatccaga gtctgttgat
121 gctgcaggtg tccttctgta ccagttgggt cattcagcac ttttactgtg agcttgctca
181 ggtcctcacg cttacctgct cagacacaca cgtcaattac atcctgctgt acgtggtgac
241 tggccttctg gactttgtgc ccttctcagg gatccttttc tcctacaccc aaattgtctc
301 ctacatccta agaatctcat ccacagatgg gaaacacaaa gccttttcta cctgtggatc
361 tcatctgttt gtggtttctt tattctatgg gacaggcctt ggtgtgtatc ttagttccaa
421 tgcatcgtcc tcttcctggt ggggcatggt ggcctcggtc atgtacactg tggtcacccc
481 catgctg (SEQ ID NO:180).

OR114

LOCUS AF179735 487 bp DNA PRI 31-DEC-2000
DEFINITION Pan troglodytes olfactory receptor (PTR210) gene, partial cds.
ACCESSION AF179735
KEYWORDS .
SOURCE chimpanzee.
ORGANISM Pan troglodytes
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia; Eutheria; Primates; Catarrhini; Hominidae; Pan.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse: Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Pan troglodytes"
/db_xref="taxon:9598"

gene <1..>487
/gene="PTR210"
CDS <1..>487
/gene="PTR210"
/codon_start=2
/product="olfactory receptor"
/translation="VAICNPLLYPVMMSNKLSAQLLSISYVIGFLHPLVHVSLLLRLT
FCRFNIIHYFYCEILQLFKISCNGPSINALMIFIFGAFIQIPTLMTIIISYSRVLFDI
LKKKSEKGRSKAFSTCSAHLLSVSLYYGTLIFMYVRPASGLAEDPDKVYSLFYTIIIP
LL" (SEQ ID NO:183).

BASE COUNT 129 a 107 c 78 g 173 t
ORIGIN
1 tgtagccata tgtaatccct tgctttatcc agtgatgatg tccaacaaac tcagcgctca
61 gttgctaagc atttcatatg taattggttt cctgcatcct ctggttcatg tgagtttact
121 attgcgacta actttctgca ggtttaacat aatacattat ttctactgtg aaattttaca
181 actgttcaaa atttcatgca atggtccatc tattaacgca ctaatgatat ttatttttgg
241 tgcttttata caaataccca ctttaatgac gatcataatc tcttattctc gtgtgctctt
301 tgatattctg aaaaaaaagt ctgaaaaggg cagaagcaaa gccttctcca catgcagcgc
361 ccatctgctt tctgtctcat tgtactacgg aactctgatc ttcatgtatg tgcgtcctgc
421 atctggctta gctgaagacc cagacaaagt gtattctctg ttttacacga ttataattcc
481 cctgcta (SEQ ID NO:182).

OR115

LOCUS AF179736 487 bp DNA PRI 31-DEC-2000
DEFINITION Pan troglodytes olfactory receptor (PTR211) gene, partial cds.
ACCESSION AF179736
KEYWORDS .
SOURCE chimpanzee.
ORGANISM Pan troglodytes
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pan.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Pan troglodytes"
/db_xref="taxon:9598"
gene <1..>487
/gene="PTR211"
CDS <1..>487
/gene="PTR211"
/codon_start=2
/product="olfactory receptor"
/translation="VAICHPLRYTVLMNIHFCGLLILLSRFMSTMDALVQSLMIFQLS
FCKNVEIPLFFCEVVQVIKLACSDTLINNILIYFASSIFGAIPLSGIIFSYSQIVTSV

LRMPSARGKYKAFSTCGCHLSVFSLFYGTAFGVSISSAVAESSRITAVGSVMYTVVPQ
MM" (SEQ ID NO:185).
BASE COUNT 102 a 120 c 98 g 167 t
ORIGIN
1 tgtggccatt tgccacccac tgaggtacac agtcctcatg aacatccatt tctgcggctt
61 gctgattctt ctctccaggt tcatgagcac tatggatgcc ctggttcaga gtctgatgat
121 atttcagctg tccttctgca aaaacgttga aatccctttg ttcttctgtg aagtcgttca
181 ggtcatcaag ctcgcctgtt ctgacaccct catcaacaac atcctcatat attttgcaag
241 tagcatattt ggtgcaattc ctctctctgg aataattttc tcttattctc aaatagtcac
301 ctctgttctg agaatgccat cagcaagagg aaagtataaa gcgttttcca cctgtggctg
361 tcacctctct gttttttcct tgttctatgg gacagctttt ggggtgtcca ttagttctgc
421 tgttgctgag tcttcccgaa ttactgctgt gggttcagtg atgtacactg tggtcccaca
481 aatgatg (SEQ ID NO:184).

OR116

LOCUS AF179737 487 bp DNA PRI 31-DEC-2000
DEFINITION Pan troglodytes olfactory receptor (PTR212) gene, partial cds.
ACCESSION AF179737
KEYWORDS .
SOURCE chimpanzee.
ORGANISM Pan troglodytes
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pan.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Pan troglodytes"
/db_xref="taxon:9598"
gene <1..>487
/gene="PTR212"
CDS <1..>487
/gene="PTR212"
/codon_start=2
/product="olfactory receptor"
/translation="VAICHPLHYTVIMREELCVFLVAVSWILSCASSLSHTLLLTRLS
FCAANTIPHVFCDLAALLKLSCSDIFLNELVMFTVGVVVITLPFMCILVSYGYIGATI
LRVPSTKGIHKALSTCGSHLSVVSLYYGSIFGQYLFPTVSSSIDKDVIVALMYTVVTP
ML" (SEQ ID NO:187).
BASE COUNT 87 a 141 c 105 g 154 t
ORIGIN
1 tgttgccata tgtcaccctc tccactacac tgtcatcatg agggaagagc tctgtgtctt
61 cttagtggct gtatcttgga ttctgtcttg tgccagctcc ctctctcaca cccttctcct
121 gacccggctg tctttctgtg ctgcgaacac catcccccat gtcttctgtg accttgctgc
181 cctgctcaag ctgtcctgct cagatatctt cctcaatgag ctggtcatgt tcacagtagg

241 ggtggtggtc attaccctgc cattcatgtg tatcctggta tcatatggct acattggggc
301 caccatcctg agggtccctt caaccaaagg gatccacaaa gcattgtcca catgtggctc
361 ccatctctct gtggtgtctc tctattatgg gtcaatattt ggccagtacc ttttcccgac
421 tgtaagcagt tctattgaca aggatgtcat tgtggctctc atgtacacgg tggtcacacc
481 catgttg (SEQ ID NO:186).

OR117

LOCUS AF179738 484 bp DNA PRI 31-DEC-2000
DEFINITION Hylobates lar HLA121 pseudogene, partial sequence.
ACCESSION AF179738
KEYWORDS .
SOURCE common gibbon.
ORGANISM Hylobates lar
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hylobatidae; Hylobates.
REFERENCE 1 (bases 1 to 484)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 484)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..484
/organism="Hylobates lar"
/db_xref="taxon:9580"
gene <1..>484
/gene="HLA121"
/pseudo
BASE COUNT 88 a 145 c 118 g 133 t
ORIGIN
1 tgtggctatc tgcctgccgc ttaggtatcc agagctcatg agtgggcaga cctgcatgca
61 gatggcagca ctgagctggg ggacaggctt tgccaactca ctgctacagt ccatccttgt
121 ctggcgcctc cctttctgtg gccacaacgt catcaaccac tttttctgtg agatcttggc
181 agtgctaaaa ctggcctgtg gggacatctc cctcaatgcg ctggcattaa tggtggccac
241 agctgtcctg acactggccc ccctcttgct catctgcctg tcttaccttt tcatcttgtc
301 tgccatcctt agggtaccct ctgctgcagg ccggcgcaaa gccttctcca cctgctcagc
361 ccacctcaca gtggtggtgg ttttttaagg gacaatttcc ttcatgtact tcaaacccaa
421 ggccaaggac cccaacgtgg ataagattgt tgcattgttg tatggggttg tgacaccctc
481 gctg (SEQ ID NO:188).

OR118

LOCUS AF179739 487 bp DNA PRI 31-DEC-2000
DEFINITION Hylobates lar olfactory receptor (HLA122) gene, partial cds.
ACCESSION AF179739
KEYWORDS .
SOURCE common gibbon.
ORGANISM Hylobates lar
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hylobatidae; Hylobates.

REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Hylobates lar"
/db_xref="taxon:9580"
gene <1..>487
/gene="HLA122"
CDS <1..>487
/gene="HLA122"
/codon_start=2
/product="olfactory receptor"
/translation="VAVCNPLLYTVAMSQRLCSLLVATSYSWGIVCFLTLTYFLLELS
FRGNNIINNFVCEHAAIVAVSCSDPYVSQEITLVSATFNEISSLMMIFTSYAFIFITV
MKMPSTGGRKKAFSTCASHLTAITIFHGTILFPYCVPNSKSSWLMVKVTSVFYTVFIP
MV" (SEQ ID NO:190).
BASE COUNT 101 a 124 c 97 g 165 t
ORIGIN
1 tgtggcggtg tgtaaccctc ttctctacac agttgcaatg tcccagaggc tttgctcctt
61 gttggtggct acatcatact cttgggggat agtctgtttc ctgacactta cctactttct
121 actggaatta tccttcagag gaaataatat cattaataac tttgtctgtg agcatgctgc
181 cattgttgct gtgtcttgct ctgaccccta tgtgagccag gagatcactt tagtttctgc
241 cacattcaat gaaataagca gtctgatgat gattttcact tcctatgctt tcatttttat
301 cactgtcatg aagatgcctt ccactggggg gcgcaagaaa gcgttctcca cgtgtgcctc
361 ccacctgacc gccattacca ttttccatgg gactatcctt ttcccctact gtgttcctaa
421 ctccaaaagt tcatggctca tggtcaaggt gacctctgtc ttttacacag tgttcattcc
481 catggtg (SEQ ID NO:189).

OR119

LOCUS AF179740 486 bp DNA PRI 31-DEC-2000
DEFINITION Hylobates lar olfactory receptor (HLA123) gene, partial cds.
ACCESSION AF179740
KEYWORDS .
SOURCE common gibbon.
ORGANISM Hylobates lar
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hylobatidae; Hylobates.
REFERENCE 1 (bases 1 to 486)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 486)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR

1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..486
/organism="Hylobates lar"
/db_xref="taxon:9580"
gene <1..>486
/gene="HLA123"
CDS <1..>486
/gene="HLA123"
/codon_start=2
/product="olfactory receptor"
/translation="VAICHPLHYATIMSQSQCVMLVAGSWVIACACALLHTLLLAQLS
FCADHIIPHFFCDLGALLKLSCSDTSLNQLAIFTAGLTAIMLPFLCILVSYGHIGVTI
LQIPSTKGICKALSTCGSHLSVVTIYYGTIIGLYFLPPSSNTNDKNIIASVIYTVVTP
M" (SEQ ID NO:192).
BASE COUNT 95 a 144 c 93 g 154 t
ORIGIN
1 tgtggccatc tgtcaccctc tacattatgc caccatcatg agtcagagcc agtgtgtcat
61 gctggtggct gggtcctggg tcatcgcttg tgcgtgtgct cttttgcata ccctcctcct
121 ggcccagctt tccttttgtg ctgaccacat catccctcac ttcttctgtg accttggtgc
181 cctgctcaag ttgtcctgct cagatacctc cctcaatcag ttggcaatct ttacagcagg
241 attgacagcc attatgcttc cattcttgtg catcctggtt tcttatggtc acattggggt
301 caccatcctc cagattccct ctaccaaggg catatgcaaa gccttgtcca cttgtggatc
361 ccacctctca gtggtgacta tctattatgg gacaattatt ggtctctatt ttcttccccc
421 atccagcaac accaatgaca agaacataat tgcttcagtg atatacacag tagtcactcc
481 catgtt (SEQ ID NO:191).

OR120

LOCUS AF179741 487 bp DNA PRI 31-DEC-2000
DEFINITION Hylobates lar olfactory receptor (HLA124) gene, partial cds.
ACCESSION AF179741
KEYWORDS .
SOURCE common gibbon.
ORGANISM Hylobates lar
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hylobatidae; Hylobates.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Hylobates lar"
/db_xref="taxon:9580"
gene <1..>487
/gene="HLA124"
CDS <1..>487
/gene="HLA124"

/codon_start=2
/product="olfactory receptor"
/translation="VAICSPLHYPVIMNQRTRAKLAAASWFPGFPVATVQTTWLFSFP
FCGTNKVNHFFCDSPPVLRLVCADTALFEIYAIVGTILVVMIPCLLILCSYTHIAAAI
LKIPSAKGKNKAFSTCSSHLLVVSLFYISLSLTYFRPKSNNSPEGKKLLSLSYTVVTP
ML" (SEQ ID NO:194).
BASE COUNT 102 a 141 c 96 g 148 t
ORIGIN
1 tgtggccatc tgtagtccct tgcactaccc agtcatcatg aaccaaagga ctcgtgccaa
61 actggctgct gcctcctggt tcccaggctt tcctgtagct actgtgcaga ccacatggct
121 cttcagtttt ccattctgtg gcaccaacaa ggtaaaccac ttcttctgtg acagcccgcc
181 tgtgctgagg ctggtctgtg cagacacagc actgtttgag atctacgcca tcgtcggaac
241 cattctggtg gtcatgatcc cttgcttgct gatcttgtgt tcctatactc acattgctgc
301 tgccatcctc aagatcccat cggctaaagg gaagaataaa gccttctcta cgtgttcctc
361 acacctcctt gttgtctctc ttttctatat atcattaagc ctcacatatt ttcggcctaa
421 atcaaataat tctcctgagg gcaagaagct gctatcattg tcctacactg ttgtgactcc
481 catgttg (SEQ ID NO:193).

OR121

LOCUS AF179742 487 bp DNA PRI 31-DEC-2000
DEFINITION Hylobates lar olfactory receptor (HLA125) gene, partial cds.
ACCESSION AF179742
KEYWORDS .
SOURCE common gibbon.
ORGANISM Hylobates lar
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hylobatidae; Hylobates.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Hylobates lar"
/db_xref="taxon:9580"
gene <1..>487
/gene="HLA125"
CDS <1..>487
/gene="HLA125"
/codon_start=2
/product="olfactory receptor"
/translation="VAICKPLHYLNIMNRRVCILLVFTSWLISFLIIFPALMLLLKLD
YCRSNIIDHFTCDYFPLLQLACSDTKFLEVMAFSCAVFTLMFTLALISLSYIYIIRTI
LRIPSTSQRTKAFSTCSSHMVVISISYGSCIFMYIKPSAKDRVSLSKGVAILNTSVAP
MM" (SEQ ID NO:196).
BASE COUNT 121 a 107 c 82 g 177 t
ORIGIN
1 tgtggccatc tgcaagcctc tgcattactt gaatatcatg aatcgaagag tctgcatact

61 gcttgttttt acttcttggc tgatttcatt cttaatcata ttccctgcac tcatgttgct
121 cttaaagctt gattactgta ggtctaatat tattgaccat tttacctgtg attattttcc
181 cctgctgcaa cttgcttgtt cagacacaaa attcttagag gtgatggcat tttcttgtgc
241 tgtgtttact ctaatgttca ctttggcatt aatatctctg tcctacatat acattatcag
301 aacaattttg agaattcctt ctactagtca gaggacaaag gccttttcca catgttcttc
361 ccacatggtt gttatttcca tctcttatgg cagctgcatt tttatgtaca ttaaaccctc
421 agcaaaagat agagtgtcct tgagcaaggg agtggcaata ctaaacacct cagtagcccc
481 catgatg (SEQ ID NO:195).

OR122

LOCUS AF179743 484 bp DNA PRI 31-DEC-2000
DEFINITION Hylobates lar olfactory receptor (HLA126) gene, partial cds.
ACCESSION AF179743
KEYWORDS .
SOURCE common gibbon.
ORGANISM Hylobates lar
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hylobatidae; Hylobates.
REFERENCE 1 (bases 1 to 484)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 484)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..484
/organism="Hylobates lar"
/db_xref="taxon:9580"
gene <1..>484
/gene="HLA126"
CDS <1..>484
/gene="HLA126"
/codon_start=2
/product="olfactory receptor"
/translation="VAICHPLHYTVIMREELCVFLVAISWILSCASSLSHTLLLTRLS
FCAANTIPHVFCDLAALLKLSCSDIFLNELVMFTVGVVVITLPFMCILVSYGYIGATI
LRVPSTKGIHKASTCGSHLSVVSLYYGSIFGQYLFPTASSSIDKDVIVAVMYTVITPM
L" (SEQ ID NO:198).
BASE COUNT 88 a 143 c 104 g 149 t
ORIGIN
1 tgttgccata tgtcaccctc tccactacac tgtcatcatg agggaagagc tctgtgtctt
61 cttagtggct atatcttgga ttctgtcttg tgccagctcc ctctctcaca cccttctcct
121 gacccggctg tctttctgtg ctgcgaacac catcccccac gtcttctgtg accttgctgc
181 cctgctcaag ctgtcctgct cagatatctt cctcaatgag ctggtcatgt tcacagtagg
241 ggtggtggtc attaccctgc cattcatgtg tatcctggta tcatatggct acattggggc
301 caccatcctg agggtccctt caaccaaagg gatccacaaa gcgtccacgt gtggctccca
361 tctttctgtg gtgtctctct attatgggtc aatatttggc cagtaccttt tcccgaccgc
421 aagcagttcc attgacaagg atgtcattgt ggctgtcatg tacacagtga tcacacccat
481 gttg (SEQ ID NO:197).

OR123

LOCUS AF179744 487 bp DNA PRI 31-DEC-2000
DEFINITION Hylobates lar olfactory receptor (HLA127) gene, partial cds.
ACCESSION AF179744
KEYWORDS .
SOURCE common gibbon.
ORGANISM Hylobates lar
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hylobatidae; Hylobates.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Hylobates lar"
/db_xref="taxon:9580"
gene <1..>487
/gene="HLA127"
CDS <1..>487
/gene="HLA127"
/codon_start=2
/product="olfactory receptor"
/translation="VAICHPLHYATIMSQSQCVMLVAGSWVIACACALLHTLLLAQLS
FCADHIIPHFFCDLGALLKLSCSDTSLNQLAIFTAGLTAIMLPFLCILVSYGHIGVTI
LQIPSTKGICKALSICGSHLSVVTIYYGTIIGLYFLPPSSNTNDKNIIASVIYTVVTP
ML" (SEQ ID NO:200).
BASE COUNT 95 a 143 c 94 g 155 t
ORIGIN
1 tgtggccatc tgtcaccctc tacattatgc caccatcatg agtcagagcc agtgtgtcat
61 gctggtggct gggtcctggg tcatcgcttg tgcgtgtgct cttttgcata ccctcctcct
121 ggcccagctt tccttttgtg ctgaccacat catccctcac ttcttctgtg accttggtgc
181 cctgctcaag ttgtcctgct cagatacctc cctcaatcag ttggcaatct ttacagcagg
241 attgacagcc attatgcttc cattcttgtg catcctggtt tcttatggtc acattggggt
301 caccatcctc cagattccct ctaccaaggg catatgcaaa gccttgtcca tttgtggatc
361 ccacctctca gtggtgacta tctattatgg gacaattatt ggtctctatt ttcttccccc
421 atccagcaac accaatgaca agaacataat tgcttcagtg atatacacag tagtcactcc
481 catgttg (SEQ ID NO:199).

OR124

LOCUS AF179745 484 bp DNA PRI 31-DEC-2000
DEFINITION Hylobates lar olfactory receptor (HLA128) gene, partial cds.
ACCESSION AF179745
KEYWORDS .
SOURCE common gibbon.
ORGANISM Hylobates lar
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Catarrhini; Hylobatidae; Hylobates.
REFERENCE 1 (bases 1 to 484)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 484)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..484
/organism="Hylobates lar"
/db_xref="taxon:9580"
gene <1..>484
/gene="HLA128"
CDS <1..>484
/gene="HLA128"
/codon_start=2
/product="olfactory receptor"
/translation="VAICHPLHYTVIMREELCVFLVAVSWILSCASSLSHTLLLTRLS
FCAANTIPHVFCDLAALLKLSCSDIFLNELVMFTVGVVVITLPFMCILVSYGYIGATI
LRVPSTKGIHKASTCGSHLSVVSLYYGSIFGQYLFPTASSSIDKDVIVAVMYTVITPM
L" (SEQ ID NO:202).
BASE COUNT 87 a 143 c 105 g 149 t
ORIGIN
1 tgttgccata tgtcaccctc tccactacac tgtcatcatg agggaagagc tctgtgtctt
61 cttagtggct gtatcttgga ttctgtcttg tgccagctcc ctctctcaca cccttctcct
121 gacccggctg tctttctgtg ctgcgaacac catcccccac gtcttctgtg accttgctgc
181 cctgctcaag ctgtcctgct cagatatctt cctcaatgag ctggtcatgt tcacagtagg
241 ggtggtggtc attaccctgc cattcatgtg tatcctggta tcatatggct acattggggc
301 caccatcctg agggtccctt caaccaaagg gatccacaaa gcgtccacgt gtggctccca
361 tctttctgtg gtgtctctct attatgggtc aatatttggc cagtaccttt tcccgaccgc
421 aagcagttcc attgacaagg atgtcattgt ggctgtcatg tacacagtga tcacacccat
481 gttg (SEQ ID NO:201).

OR125

LOCUS AF179746 484 bp DNA PRI 31-DEC-2000
DEFINITION Hylobates lar olfactory receptor (HLA129) gene, partial cds.
ACCESSION AF179746
KEYWORDS .
SOURCE common gibbon.
ORGANISM Hylobates lar
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hylobatidae; Hylobates.
REFERENCE 1 (bases 1 to 484)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 484)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..484
/organism="Hylobates lar"
/db_xref="taxon:9580"
gene <1..>484
/gene="HLA129"
CDS <1..>484
/gene="HLA129"
/codon_start=2
/product="olfactory receptor"
/translation="VAICHPLHYATIMSQSQCVMLVAGSWVIACACALLHTLLLAQLS FCADHIIPHFFCDLGALLKLSCSDTFLNELVMFTVGVVVITLPFMCILVSYGYIGATI LRVPSTKGIHKASTCGSHLSVVSLYYGSIFGQYLFPTASSSIDKDVIVAVMYTVITPM L" (SEQ ID NO:204).
BASE COUNT 85 a 139 c 111 g 149 t
ORIGIN
1 tgtggccatc tgtcaccctc tacattatgc caccatcatg agtcagagcc agtgtgtcat
61 gctggtggct gggtcctggg tcatcgcttg tgcgtgtgct cttttgcata ccctcctcct
121 ggcccagctt tccttttgtg ctgaccacat catccctcac ttcttctgtg accttggtgc
181 cctgctcaag ttgtcctgct cagatacctt cctcaatgag ctggtcatgt tcacagtagg
241 ggtggtggtc attaccctgc cattcatgtg tatcctggta tcatatggct acattggggc
301 caccatcctg agggtccctt caaccaaagg gatccacaaa gcgtccacgt gtggctccca
361 tctttctgtg gtgtctctct attatgggtc aatatttggc cagtaccttt tcccgaccgc
421 aagcagttcc attgacaagg atgtcattgt ggctgtcatg tacacagtga tcacacccat
481 gttg (SEQ ID NO:203).

OR126

LOCUS AF179747 486 bp DNA PRI 31-DEC-2000
DEFINITION Hylobates lar HLA130 pseudogene, partial sequence.
ACCESSION AF179747
KEYWORDS .
SOURCE common gibbon.
ORGANISM Hylobates lar
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia; Eutheria; Primates; Catarrhini; Hylobatidae; Hylobates.
REFERENCE 1 (bases 1 to 486)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse: Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 486)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..486
/organism="Hylobates lar"
/db_xref="taxon:9580"
gene <1..>486
/gene="HLA130"
/pseudo

BASE COUNT 95 a 142 c 94 g 155 t
ORIGIN
1 tgtggccatc tgtcaccctc tacattatgc accatcatga gtcagagcca gtgtgtcatg
61 ctggtggctg ggtcctgggt catcgcttgt gcgtgtgctc ttttgcatac cctcctcctg
121 gcccagcttt ccttttgtgc tgaccacatc atccctcact tcttctgtga ccttggtgcc
181 ctgctcaagt tgtcctgctc agatacctcc ctcaatcagt tggcaatctt tacagcagga
241 ttgacagcca ttatgcttcc attcttgtgc atcctggttt cttatggtca cattggggtc
301 accatcctcc agattccctc taccaagggc atatgcaaag ccttgtccat ttgtggatcc
361 cacctctcag tggtgactat ctattatggg acaattattg gtctctattt tcttccccca
421 tccagcaaca ccaatgacaa gaacataatt gcttcagtga tatacacagt agtcactccc
481 atgttg (SEQ ID NO:205).

OR127

LOCUS AF179748 487 bp DNA PRI 31-DEC-2000
DEFINITION Hylobates lar olfactory receptor (HLA131) gene, partial cds.
ACCESSION AF179748
KEYWORDS .
SOURCE common gibbon.
ORGANISM Hylobates lar
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hylobatidae; Hylobates.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Hylobates lar"
/db_xref="taxon:9580"
gene <1..>487
/gene="HLA131"
CDS <1..>487
/gene="HLA131"
/codon_start=2
/product="olfactory receptor"
/translation="VAICRPLYYPVIMKPHLCGLLVLVSWFLSLSYSLIQSLLMLRVS
FCTSWVIQHFYCELAQVLTLACSDTHINYILLYMVTGLLGFVPFSGILFSYTQIVSSI
LRISSPDGKHKAFSTCGSHLSVVSLFYGTGLGVYLSSNASSSSWRGMVASVMYTVVTP
NV" (SEQ ID NO:207).
BASE COUNT 80 a 145 c 106 g 156 t
ORIGIN
1 tgtggccatc tgtcgccccc tgtactaccc tgtcatcatg aaacctcacc tctgtggcct
61 gctggttctt gtgtcctggt tcctcagctt gtcatactcc ctgatccaga gtctgttgat
121 gctgcgggtg tccttctgca ccagttgggt cattcagcac ttttactgtg agcttgctca
181 ggtcctcacg cttgcctgct cagacacaca catcaattac atcctgctct acatggtgac
241 cggccttttg ggctttgtgc ccttctcagg gatccttttc tcctacaccc aaatcgtctc
301 ctccatcctg agaatctcat ccccagatgg gaaacacaaa gccttttcta cctgtggatc

361 tcatctgtct gtggtttctt tattctatgg gacaggtctt ggcgtgtatc ttagttccaa
421 tgcatcgtcc tcttcctggc ggggcatggt ggcttcggta atgtacactg tggtaacccc
481 caatgtg (SEQ ID NO:206).

OR128

LOCUS AF179749 487 bp DNA PRI 31-DEC-2000
DEFINITION Hylobates lar olfactory receptor (HLA132) gene, partial cds.
ACCESSION AF179749
KEYWORDS .
SOURCE common gibbon.
ORGANISM Hylobates lar
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hylobatidae; Hylobates.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Hylobates lar"
/db_xref="taxon:9580"
gene <1..>487
/gene="HLA132"
CDS <1..>487
/gene="HLA132"
/codon_start=2
/product="olfactory receptor"
/translation="VAICHPLHYATIMSQSQCVMLVAGSWVIACACALLHTLLLAQLS
FCADHIIPHFFCDLGALLKLSCSDTSLNQLAIFTAGLTAIMLPFLCILVSYGHIGVTI
LQTPSTKGICKALSICGSHLSVVTIYYGTIIGLYFLPPSSNTNDKNIIASVIYTVVTP
ML" (SEQ ID NO:209).
BASE COUNT 95 a 144 c 94 g 154 t
ORIGIN
1 tgtggccatc tgtcaccctc tacattatgc caccatcatg agtcagagcc agtgtgtcat
61 gctggtggct gggtcctggg tcatcgcttg tgcgtgtgct cttttgcata ccctcctcct
121 ggcccagctt tccttttgtg ctgaccacat catccctcac ttcttctgtg accttggtgc
181 cctgctcaag ttgtcctgct cagatacctc cctcaatcag ttggcaatct ttacagcagg
241 attgacagcc attatgcttc cattcttgtg catcctggtt tcttatggtc acattggggt
301 caccatcctc cagactccct ctaccaaggg catatgcaaa gccttgtcca tttgtggatc
361 ccacctctca gtggtgacta tctattatgg gacaattatt ggtctctatt ttcttccccc
421 atccagcaac accaatgaca agaacataat tgcttcagtg atatacacag tagtcactcc
481 catgttg (SEQ ID NO:208).

OR129

LOCUS AF179750 487 bp DNA PRI 31-DEC-2000
DEFINITION Gorilla gorilla olfactory receptor (GGO100) gene, partial cds.
ACCESSION AF179750

KEYWORDS .
SOURCE gorilla.
ORGANISM Gorilla gorilla
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Gorilla.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Gorilla gorilla"
/db_xref="taxon:9593"
gene <1..>487
/gene="GGO100"
CDS <1..>487
/gene="GGO100"
/codon_start=2
/product="olfactory receptor"
/translation="VAICHPLHYTFIMDQNTCIQLAVISWSSSFLCSMVINVLTLSLP
YCGPNILNHFFCEVPTVLRLSCTDTSFTELVVFIFSIIIVFIPFLLIVVSYVRILQSV

LRMRSASGRYKALSTCTSHLTVVTLFYGTAILMYMRPQSRSSWAGGKIIAVFYTVVTP
ML" (SEQ ID NO:211).
BASE COUNT 91 a 130 c 97 g 169 t
ORIGIN
1 tgtagccatt tgtcatcctc ttcattatac cttcattatg gaccaaaaca cctgcattca
61 actggcagtt atttcttggt ccagtagctt cctgtgttcc atggttatca atgttctcac
121 gttgagtttg ccctactgtg ggcctaatat cctgaatcac tttttctgtg aggtacctac
181 tgtcctgagg ttgtcttgca ccgacacctc attcacggag ctggttgttt ttatcttcag
241 tatcatcatt gtcttcatcc ctttcctcct cattgttgtt tcctatgtcc ggatccttca
301 atctgttctc aggatgcggt cagcctccgg gcggtataag gcattatcca cctgtacctc
361 ccatttgaca gtggtaacct tattttatgg gactgccatc ctcatgtaca tgagaccaca
421 gtcgaggtct tcctgggctg gcggcaagat cattgcggtt ttctacacgg tggtcacacc
481 catgctt (SEQ ID NO:210).

OR130

LOCUS AF179751 488 bp DNA PRI 31-DEC-2000
DEFINITION Gorilla gorilla GGO101 pseudogene, partial sequence.
ACCESSION AF179751
KEYWORDS .
SOURCE gorilla.
ORGANISM Gorilla gorilla
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Gorilla.
REFERENCE 1 (bases 1 to 488)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:

Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 488)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..488
/organism="Gorilla gorilla"
/db_xref="taxon:9593"
gene <1..>488
/gene="GGO101"
/pseudo
BASE COUNT 91 a 144 c 113 g 140 t
ORIGIN
1 tgtggccatt agccacccac ttcactatcc catcctcatg aatcagaggg tctgtctcca
61 gattaccggg agctcctggg cctttgggat aatcgatggc tttgatccag atggtggtag
121 taatgaattt cccctactgt ggcttgagga aggtgaacca tttcttctgt gagatgctat
181 ccttgttgaa gctggcctgt gtagacacat ccctgtttga gaaggtgata tttgcttgct
241 gtgtcttcat gcttctcttc ccattctcca tcatcgtggc ctcctatgct cgcattctag
301 ggactgtgct gcaaatgcac tctgctcagg cctggaaaaa ggccctggcc acctgctcct
361 cccacctgac agctgtcacc ctcttctatg gggcagccat gttcatctac ctgaggccta
421 ggcgctaccg ggccccccagc catgacaagg tggcctctat cttctacaca gtccttactc
481 ccatgctg (SEQ ID NO:212).

OR131

LOCUS AF179752 487 bp DNA PRI 31-DEC-2000
DEFINITION Gorilla gorilla olfactory receptor (GGO102) gene, partial cds.
ACCESSION AF179752
KEYWORDS .
SOURCE gorilla.
ORGANISM Gorilla gorilla
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia; Eutheria; Primates; Catarrhini; Hominidae; Gorilla.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse: Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Gorilla gorilla"
/db_xref="taxon:9593"
gene <1..>487
/gene="GGO102"
CDS <1..>487
/gene="GGO102"
/codon_start=2

/product="olfactory receptor"
/translation="VVICHPLHYTVIMREEFCVFLVAVSWILSCASSLSHTVLLTQLS
FCAANTIPHVFCDLAALLKLSCSDIFLNELVMFTVGVVVITLPFMCILVSYGYIGATI
LGVPSTKGIHKALSTCGSHLSVVSLYYGSIFGQYLFPTVSSFIDKDVIVALMYTVVTP
TL" (SEQ ID NO:214).

BASE COUNT 87 a 137 c 106 g 157 t

ORIGIN

1 tgttgtcata tgtcaccctc tccactacac tgtcatcatg agggaagagt tctgtgtctt
61 cttagtggct gtatcttgga ttctgtcttg tgccagctcc ctctctcaca ccgttctcct
121 gacccagctg tctttctgtg ctgcgaacac catcccccat gtcttctgtg accttgctgc
181 cctgctcaag ctgtcctgct cagatatctt cctcaatgag ctggtcatgt tcacagtagg
241 ggtggtggtc attaccctgc cattcatgtg tatcctggta tcatatggtt acattggggc
301 caccatcctg ggggtccctt caaccaaagg gatccacaaa gcattgtcca catgtggctc
361 ccatctctct gtggtgtctc tctattatgg gtcaatattt ggccagtacc ttttcccgac
421 tgtaagcagt tttattgaca aggatgtcat tgtggctctc atgtacacgg tggtcacacc
481 cacgttg (SEQ ID NO:213).

OR132

LOCUS AF179753 488 bp DNA PRI 31-DEC-2000

DEFINITION Gorilla gorilla GGO103 pseudogene, partial sequence.

ACCESSION AF179753

KEYWORDS .

SOURCE gorilla.

ORGANISM Gorilla gorilla
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Gorilla.

REFERENCE 1 (bases 1 to 488)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 488)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..488
/organism="Gorilla gorilla"
/db_xref="taxon:9593"

gene <1..>488
/gene="GGO103"
/pseudo

BASE COUNT 86 a 149 c 108 g 145 t

ORIGIN

1 tgcggctgtc tgccacccac tccgatatcc cactctcatg agctggcagc tgtgcctgag
61 gataaccatg ttgtcttggc tcctgggtgc agctgacggg ctcatgcagg ctgttgctac
121 cctgagcttc ccatattgcg gtgcacacga gatcgatcac ttcttctgcg aggcccccgt
181 gctggttcat ttggcttgtg ctgacacttc agtcttcgaa aacgccatgt acatctgctg
241 tgtgttaatg ctcctggtcc ccttttccct catcctgtcc tcctatggtc tcatcctcgc
301 tgctgttctg cacatgcgct ctacagaagc ccgcaagaag gcctttgcca cctgctcttc
361 acatttggct gtggtgggac tcttttatgg agctgccatt tttacctata tgagacccaa
421 atcccacagg tccactaacc acgataaggt tgtgtcagcc ttctatagta tgttcacccc
481 tttactaa (SEQ ID NO:215).

OR133

LOCUS AF179754 458 bp DNA PRI 31-DEC-2000
DEFINITION Gorilla gorilla GGO104 pseudogene, partial sequence.
ACCESSION AF179754
KEYWORDS .
SOURCE gorilla.
ORGANISM Gorilla gorilla
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Gorilla.
REFERENCE 1 (bases 1 to 458)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 458)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..458
/organism="Gorilla gorilla"
/db_xref="taxon:9593"
gene <1..>458
/gene="GGO104"
/pseudo
BASE COUNT 89 a 139 c 88 g 142 t
ORIGIN
1 ccaccatcat gagtcacagc cagtgtgtca tgctggtggc tgggtcctgg gtcatcgctt
61 gtgcgtgtgc tcttttgcat accctcctcc tggcccggct ttccttctgt gctgaccaca
121 tcatccctca cttcttctgt gaccttggtg ccctgctcaa gttgtcctgc tcagacacct
181 ccctcaatca gttagcaatc tttacagcag gattgacagc cattatgctt ccattcctgt
241 gcatcctggt ttcttatggt cacattgggg tcaccatcct ccagattccc tctaccaagg
301 gcatatgcaa agccttgtcc acttgtggat cccacctctc agtggtgact atctattatg
361 ggacaattat tggtctctat tttcttcccc catcctgcaa caccaatgac gagaacataa
421 ttgcttcagt gatatacaca gtagtcactc ccatattg (SEQ ID NO:216).

OR134

LOCUS AF179755 477 bp DNA PRI 31-DEC-2000
DEFINITION Gorilla gorilla olfactory receptor (GGO106) gene, partial cds.
ACCESSION AF179755
KEYWORDS .
SOURCE gorilla.
ORGANISM Gorilla gorilla
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Gorilla.
REFERENCE 1 (bases 1 to 477)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 477)

AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..477
/organism="Gorilla gorilla"
/db_xref="taxon:9593"
gene <1..>477
/gene="GGO106"
CDS <1..>477
/gene="GGO106"
/codon_start=2
/product="olfactory receptor"
/translation="VAIRKPLHYLVIMRQWVCVVLLVMSWVGGFLHSVFQLSIIYGLP
FCGPNVIDHFFCDMYPLLKLVCTDTHVIGLLVVTNGGLSCTIVFLLLLISYGVILHSL
KKLSQKGRQKALSTCSSHITVVVFFFVPCIFMYARPARSFPIDKSVSVFYTVITPML"
(SEQ ID NO:218).
BASE COUNT 100 a 108 c 100 g 169 t
ORIGIN
1 tgtggccatc cgtaagccct tgcattattt ggttatcatg agacaatggg tgtgtgttgt
61 gctgctggta atgtcctggg ttggaggatt tctgcactca gtatttcaac ttagcattat
121 ttatgggctc ccattctgtg gccccaatgt cattgatcac tttttctgtg acatgtatcc
181 cttattgaaa ctggtctgca ctgacaccca tgttattggc ctcttagtgg tgaccaatgg
241 aggactgtct tgcactattg tgtttctgct cttactcatc tcttatggtg tcatcttgca
301 ctctctaaag aaacttagtc agaaagggag gcaaaaagcc ctctcaacct gcagttccca
361 catcactgtg gttgtcttct tctttgttcc ttgtattttt atgtatgcta gacctgctag
421 gagcttcccc attgacaaat cagtgagtgt gttttataca gtcataaccc caatgct (SEQ ID NO:217).

OR135

LOCUS AF179756 488 bp DNA PRI 31-DEC-2000
DEFINITION Gorilla gorilla olfactory receptor (GGO107) gene, partial cds.
ACCESSION AF179756
KEYWORDS .
SOURCE gorilla.
ORGANISM Gorilla gorilla
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia; Eutheria; Primates; Catarrhini; Hominidae; Gorilla.
REFERENCE 1 (bases 1 to 488)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse: Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 488)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..488
/organism="Gorilla gorilla"
/db_xref="taxon:9593"
gene <1..>488
/gene="GGO107"

CDS <1..>488
/gene="GGO107"
/codon_start=2
/product="olfactory receptor"
/translation="LAICYPLHYGAMMSSLLSVQLALGSWVCGFMAIAVPTALISGLS
FCGPRAINHFFCDIAPWIALACTNTQAVELVAFVIAVVVILSSCLITLVSYVYIISTI
LRIPSASGRSKAFSTCSSHLTVVLIWYGSTIFLHVRTSIKDALDLIKAVHVLNTVVTP
VL" (SEQ ID NO:220).
BASE COUNT 84 a 155 c 108 g 141 t
ORIGIN
1 tcttgccatc tgctatcctt tacactacgg agccatgatg agtagcctgc tctcagtgca
61 gttggccctg ggctcctggg tttgtggttt catggccatt gcagtgccca cagccctcat
121 cagtggcctg tccttctgtg gcccccgtgc catcaaccac ttcttctgtg acattgcacc
181 ctggattgcc ctggcctgca ccaacacaca ggcagtagag cttgtggcct ttgtgattgc
241 tgttgtggtt atcctgagtt catgcctcat caccettgtc tcctatgtgt acatcatcag
301 caccatcctc aggatcccct ctgccagtgg ccggagcaaa gccttctcca cgtgctcctc
361 gcatctcacc gtggtgctca tttggtatgg gtccacaatt ttccttcacg tccgcacctc
421 tatcaaagac gccttggatc tgatcaaagc tgtccacgtc ctgaacactg tggtgactcc
481 agttttaa (SEQ ID NO:219).

OR136

LOCUS AF179757 480 bp DNA PRI 31-DEC-2000
DEFINITION Gorilla gorilla GGO108 pseudogene, partial sequence.
ACCESSION AF179757
KEYWORDS .
SOURCE gorilla.
ORGANISM Gorilla gorilla
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Gorilla.
REFERENCE 1 (bases 1 to 480)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 480)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..480
/organism="Gorilla gorilla"
/db_xref="taxon:9593"
gene <1..>480
/gene="GGO108"
/pseudo
BASE COUNT 95 a 125 c 101 g 159 t
ORIGIN
1 tgtggcggtg tgtaaccctc ttctctacac agttgcaatg tcccagaggc tttgctcctt
61 gttggtggct acatcatact gttgggggac agtctgttcc ctgacaccta ctttctactg
121 gaattatcct tcagaggaaa taatatcatt aataactttg tctgtgagca cgctgtcatt
181 gttgctgtgt cttgctctga cccctatttg agccaggaga tcactttagt ttctgccaac
241 attcaatgaa ataagcagcc tggtgatcat tctcacttcc tatgctttca tttttatcac
301 tgtcatgaag acgccttcca ctgggggggcg caagaaagcg ttctccacgt gtgcctccca

361 cttgacggcc attaccattt tccatgggac tatccttttc ctctactgtg ttcctaactc
421 aagttcgcgg ctcatggtca aggtggcctc tgtcttttgc acagtggtca ttcccatgtg (SEQ ID NO:221).

OR137

LOCUS AF179758 487 bp DNA PRI 31-DEC-2000
DEFINITION Gorilla gorilla olfactory receptor (GGO109) gene, partial cds.
ACCESSION AF179758
KEYWORDS .
SOURCE gorilla.
ORGANISM Gorilla gorilla
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Gorilla.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Gorilla gorilla"
/db_xref="taxon:9593"
gene <1..>487
/gene="GGO109"
CDS <1..>487
/gene="GGO109"
/codon_start=2
/product="olfactory receptor"
/translation="VAICHPLHYATIMSHSQCVMLVAGSWVIACACALLHTLLLARLS
FCADHIIPHFFCDLGALLKLSCSDTSLNQLAIFTAGLTAIMLPFLCILVSYGHIGVTI
LQIPSTKGICKALSTCGSHLSVVTIYYGTIIGLYFLPPSSNTNDKNIIASVIYTVVTP
ML" (SEQ ID NO:223).
BASE COUNT 95 a 148 c 93 g 151 t
ORIGIN
1 tgtggccatc tgtcaccctc tacattatgc caccatcatg agtcacagcc agtgtgtcat
61 gctggtggct gggtcctggg tcatcgcttg tgcgtgtgct cttttgcata ccctcctcct
121 ggcccggctt tccttctgtg ctgaccacat catccctcac ttcttctgtg accttggtgc
181 cctgctcaag ttgtcctgct cagacacctc cctcaatcag ttagcaatct ttacagcagg
241 attgacagcc attatgcttc cattcctgtg catcctggtt tcttatggtc acattggggt
301 caccatcctc cagattccct ctaccaaggg catatgcaaa gccttgtcca cttgtggatc
361 ccacctctca gtggtgacta tctattatgg gacaattatt ggtctctatt ttcttccccc
421 atccagcaac accaatgaca agaacataat tgcttcagtg atatacacag tagtcactcc
481 catgttg (SEQ ID NO:222).

OR138

LOCUS AF179759 487 bp DNA PRI 31-DEC-2000
DEFINITION Homo sapiens olfactory receptor (HSA1) gene, partial cds.
ACCESSION AF179759
KEYWORDS .

SOURCE human.
ORGANISM Homo sapiens
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Homo.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Homo sapiens"
/db_xref="taxon:9606"
gene <1..>487
/gene="HSA1"
CDS <1..>487
/gene="HSA1"
/codon_start=2
/product="olfactory receptor"
/translation="VAICNPLLYPVMMSNKLSAQLLSISYVIGFLHPLVHVSLLLRLT
FCRFNIIHYFYCEILQLFKISCNGPSINALIIFIFGAFIQIPTLMTIIISYTRVLFDI
LKKKSEKGRSKAFSTCGAHLLSVSLYYGTLIFMYVRPASGLAEDQDKVYSLFYTIIIP
LL" (SEQ ID NO:225).
BASE COUNT 131 a 105 c 77 g 174 t
ORIGIN
1 tgtagccata tgtaatccct tgctttatcc agtgatgatg tccaacaaac tcagcgctca
61 gttgctaagt atttcatatg taattggttt cctgcatcct ctggttcatg tgagtttact
121 attgcgacta actttctgca ggtttaacat aatacattat ttctactgtg aaatttttaca
181 actgttcaaa atttcatgca atggtccatc tattaacgca ctaataatat ttatttttgg
241 tgcttttata caaataccca ctttaatgac tatcataatc tcttatactc gtgtgctctt
301 tgatattctg aaaaaaaagt ctgaaaaggg cagaagcaaa gccttctcca catgcggcgc
361 ccatctgctt tctgtctcat tgtactacgg aactctgatc ttcatgtatg tgcgtcctgc
421 atctggctta gctgaagacc aagacaaagt gtattctctg ttttacacga ttataattcc
481 cctgcta (SEQ ID NO:224).

OR139

LOCUS AF179760 487 bp DNA PRI 31-DEC-2000
DEFINITION Homo sapiens olfactory receptor (HSA10) gene, partial cds.
ACCESSION AF179760
KEYWORDS .
SOURCE human.
ORGANISM Homo sapiens
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Homo.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Homo sapiens"
/db_xref="taxon:9606"
gene <1..>487
/gene="HSA10"
CDS <1..>487
/gene="HSA10"
/codon_start=2
/product="olfactory receptor"
/translation="VAICHPLHYTVIMREELCVFLVAVSRILSCASSLSHTLLLTRLS
FCAANTVPHVFCDLAALLKLSCSDIFLNELVMFTVGVVVITLPFMCILVSYGYIGATI
LRVPSTKGIHKALSTCGSHLSVVSLYYGSIFGQYLFPTVSSSIDKDVIVALMYTVDTP
ML" (SEQ ID NO:227).
BASE COUNT 87 a 142 c 106 g 152 t
ORIGIN
1 tgttgccata tgtcaccctc tccactacac tgtcatcatg agggaagagc tctgtgtctt
61 cttagtggct gtatctcgga ttctgtcttg tgccagctcc ctctctcaca cccttctcct
121 gacccggctg tctttctgtg ctgcgaacac cgtcccccat gtcttctgtg accttgctgc
181 cctgctcaag ctgtcctgct cagatatctt cctcaatgag ctggtcatgt tcacagtagg
241 ggtggtggtc attaccctgc cattcatgtg tatcctggta tcatatggct acattggggc
301 caccatcctg agggtccctt caaccaaagg gatccacaaa gcattgtcca catgtggctc
361 ccatctctct gtggtgtctc tctattatgg gtcaatattt ggccagtacc ttttcccgac
421 tgtaagcagt tctattgaca aggatgtcat tgtggctctc atgtacacgg tggacacacc
481 catgttg (SEQ ID NO:226).

OR140

LOCUS AF179761 487 bp DNA PRI 31-DEC-2000
DEFINITION Homo sapiens olfactory receptor (HSA12) gene, partial cds.
ACCESSION AF179761
KEYWORDS .
SOURCE human.
ORGANISM Homo sapiens
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Homo.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Homo sapiens"
/db_xref="taxon:9606"

gene <1..>487
/gene="HSA12"
CDS <1..>487
/gene="HSA12"
/codon_start=2
/product="olfactory receptor"
/translation="VAICFPLHYTAIMSPMLCLALVALSWVLTTFHAMLHTLLMARLC
FCADNVIPHFFCDMSALLKLAFSDTRVNEWVIFIMGGLILVIPFLLILGSYARIVSSI
LKVPSSKGICKALSTCGSHLSVVSLFYGTVIGLYLCSSANSSTLKDTVMAMMYTVVTP
ML" (SEQ ID NO:229).
BASE COUNT 85 a 141 c 103 g 158 t
ORIGIN
1 tgtggccatc tgcttccccc tgcactacac cgccatcatg agccccatgc tctgtctcgc
61 cctggtggcg ctgtcctggg tgctgaccac cttccatgcc atgttacaca ctttactcat
121 ggccaggttg tgtttttgtg cagacaatgt gatcccccac tttttctgtg atatgtctgc
181 tctgctgaag ctggccttct ctgacactcg agttaatgaa tgggtgatat ttatcatggg
241 agggctcatt cttgtcatcc cattcctact catccttggg tcctatgcaa gaattgtctc
301 ctccatcctc aaggtccctt cttctaaggg tatctgcaag gccctctcta cttgtggctc
361 ccacctgtct gtggtgtcac tgttctatgg aaccgttatt ggtctctact tatgctcatc
421 agctaatagt tctactctaa aggacactgt catggctatg atgtacactg tggtgacccc
481 catgctg (SEQ ID NO:228).

OR141

LOCUS AF179762 486 bp DNA PRI 31-DEC-2000
DEFINITION Homo sapiens HSA13 pseudogene, partial sequence.
ACCESSION AF179762
KEYWORDS .
SOURCE human.
ORGANISM Homo sapiens
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Homo.
REFERENCE 1 (bases 1 to 486)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 486)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..486
/organism="Homo sapiens"
/db_xref="taxon:9606"
gene <1..>486
/gene="HSA13"
/pseudo
BASE COUNT 108 a 139 c 96 g 143 t
ORIGIN
1 cgtggctgtg tgtaaccccc tcctctatgc catagtcatg acaccaatga cccgcctggc
61 gctgctggcc ggggcatatt ctggtgccat agtcaattct gtgatctgca ctggctgcac
121 cttctctatc tccttctcta agtccaacca tgtagacttc tttttctgtg acctcccacc
181 cctgctgaag cttgcctgta gtgaaaccag gccacgggaa tgggtgatct acctctcagc

241 ttttctggtc atcacaacca gcatttcagt gattcttaca tcgtacttgt tcatcattca
301 gtctattctg aagattcgta cagcaggtgg aaagccaaga ccttctccac ctgtgcttct
361 cacaagactg cattgactct cttctttgga acactcatat tcatatacct gaaaggcaac
421 atgggcgaat cccttgagga agacaagatc gtgtcaatat tttacactgt ggtcatcccc
481 atgcta (SEQ ID NO:230).

OR142

LOCUS AF179763 487 bp DNA PRI 31-DEC-2000
DEFINITION Homo sapiens HSA16 pseudogene, partial sequence.
ACCESSION AF179763
KEYWORDS .
SOURCE human.
ORGANISM Homo sapiens
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Homo.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Homo sapiens"
/db_xref="taxon:9606"
gene <1..>487
/gene="HSA16"
/pseudo
BASE COUNT 111 a 110 c 96 g 170 t
ORIGIN
1 catggccatt gtgaaccctt tactttatac agtagctatg actaaaatag tttgtattgt
61 gctcgcattt gggtcatgta tgggaggttt aatcagctca ttgacacata caattggctt
121 ggtgaaactg tctttctgtg ggccaaatgt catcagtcac ttcttctgtg atcttccccc
181 actgttgaag ctgtcatgtt ctgagacatc tatgaatgaa ttgttgcttt tgatcttctc
241 tggcattatt gccacgctca ctttttgac tgtggtgatc tcctacatct tcattgttgc
301 tgctatcctg aggatccgct aagaagcagg tagacgtaaa gccttctcca cctgcacctc
361 tcacctgatt accgtgacct tattctatgg atcgataagc tttagttaca ttcagccaaa
421 ctcccagtat tccctagaac aagaaaaggt ggtgtctgta ttttataccc tggtggttcc
481 tatgtta (SEQ ID NO:231).

OR143

LOCUS AF179764 485 bp DNA PRI 31-DEC-2000
DEFINITION Homo sapiens HSA18 pseudogene, partial sequence.
ACCESSION AF179764
KEYWORDS .
SOURCE human.
ORGANISM Homo sapiens
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Homo.

REFERENCE 1 (bases 1 to 485)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 485)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..485
/organism="Homo sapiens"
/db_xref="taxon:9606"
gene <1..>485
/gene="HSA18"
/pseudo
BASE COUNT 90 a 116 c 106 g 173 t
ORIGIN
1 cgtgggcatc tgtaacccac tgttgtacac ggtcaccatg tctccccaga agtgtttgct
61 ccttttactg ggtgtctatg ggatggggat tttggggctg tggctcatat gggaaacata
121 atgtttatgt ccttttgtgg agacaacctt gtcaatcact atatgtgtga catccttcct
181 ctccttgagc tctcctgcaa cagctcttac ataaatttgc tggtggtttt tattattgtg
241 accgttggca ttggggtgcc gattgtcacc atttttctct cttatggttt tattctttcc
301 agcattctcc acattagttc cacagagggc aggtctaaag ccttcagtac ctgcagttcc
361 cacataattg tggtatcgct ttctttgggt caggtgcttt catgtacctc aaaccacctt
421 ctattctacc cctggaccag gggaaagtgt cctccatttt ttgtactgct gtggtgccca
481 tgttt (SEQ ID NO:232).

OR144

LOCUS AF179765 486 bp DNA PRI 31-DEC-2000
DEFINITION Homo sapiens HSA2 pseudogene, partial sequence.
ACCESSION AF179765
KEYWORDS .
SOURCE human.
ORGANISM Homo sapiens
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Homo.
REFERENCE 1 (bases 1 to 486)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 486)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..486
/organism="Homo sapiens"
/db_xref="taxon:9606"
gene <1..>486
/gene="HSA2"

/pseudo
BASE COUNT 88 a 117 c 107 g 174 t
ORIGIN
1 cgtgggcatc tgtaacccac tgttgtacac ggtcaccatg tctccccaga tgtgtttgct
61 ccttttactg ggtgtctatg gggtggggat tttggggctg tggctcatat gggaaacata
121 atgtttatgt ccttttgtgg agacaacctt gtcaatcact atatgtgtga catccttcct
181 ctccttgagc cctcctgcaa cagctcttac ataaatttgc tggtggtttt tattattgtg
241 accgttggca ttggggtgcc gattgtcacc atttttctct cttatggttt tattctttcc
301 agcattctcc acattagttc cacagagggc aggtctaaag ccttcagtac ctgcagttcc
361 cacataattg tggtatcgct tttctttggg tcaggtgctt tcatgtacct caaaccacct
421 tctattctac ccctggacca ggggaaagtg tcctccattt tttgtactgc tgtggtgccc
481 atgttt (SEQ ID NO:233).

OR145

LOCUS AF179766 487 bp DNA PRI 31-DEC-2000
DEFINITION Homo sapiens olfactory receptor (HSA3) gene, partial cds.
ACCESSION AF179766
KEYWORDS .
SOURCE human.
ORGANISM Homo sapiens
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Homo.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Homo sapiens"
/db_xref="taxon:9606"
gene <1..>487
/gene="HSA3"
CDS <1..>487
/gene="HSA3"
/codon_start=2
/product="olfactory receptor"
/translation="VAICKPLHYVVIMNNRVCTLLVLCCWVAGLMIIVPPLSLGLQLE
FCDSNAIDHFSCDAGPLLKISCSDTWVIEQMVILMAVFALIITPVCVILSYLYIVRTI
LKFPSVQQRKKAFSTCSSHMIVVSIAYGSCIFIYIKPSAKDEVAINKGVSVLTTSVAP
LL" (SEQ ID NO:235).
BASE COUNT 114 a 113 c 97 g 163 t
ORIGIN
1 tgtggccatc tgtaaacccc ttcattatgt ggtcatcatg aacaacaggg tgtgtacctt
61 attagttctc tgctgttggg tggctggctt gatgatcatt gttccaccac ttagcttagg
121 cctccagctc gaattctgtg actccaatgc cattgatcat tttagctgtg atgcaggtcc
181 tctcctaaag atctcatgct cagatacatg ggtaatagaa cagatggtta tacttatggc
241 tgtatttgca ctcattatca ccccagtttg tgtgattctg tcctacttgt acatagtcag
301 aacaattctg aagttccctt ctgttcagca aaggaaaaag gccttttcta cctgttcatc

361 ccacatgatt gtggtttcca ttgcctatgg aagctgcatc ttcatctata tcaagccctc
421 tgcaaaagat gaggtggcca taaataaagg agtttcagtt cttactactt ctgtcgcacc
481 cttgttg (SEQ ID NO:234).

OR146

LOCUS AF179767 487 bp DNA PRI 31-DEC-2000
DEFINITION Homo sapiens olfactory receptor (HSA5) gene, partial cds.
ACCESSION AF179767
KEYWORDS .
SOURCE human.
ORGANISM Homo sapiens
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Homo.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Homo sapiens"
/db_xref="taxon:9606"
gene <1..>487
/gene="HSA5"
CDS <1..>487
/gene="HSA5"
/codon_start=2
/product="olfactory receptor"
/translation="VAICHPLHYTVIMREELCVFLVAVTWILSCASSLSHTLLLTRLS
FCAANTIPHVFCDLAALLKLSCSDIFLNELVMFTVGVVVITLPFMCILVSYGYIGATI
LRVPSTKGIHKALSTCGSHLSVVSLYYGSIFGQYLFPTVSSSIDKDVIVALMYTVVTP
ML" (SEQ ID NO:237).
BASE COUNT 88 a 141 c 105 g 153 t
ORIGIN
1 tgttgccata tgtcaccctc tccactacac tgtcatcatg agggaagagc tctgtgtctt
61 cttagtggct gtaacttgga ttctgtcttg tgccagctcc ctctctcaca cccttctcct
121 gacccggctg tctttctgtg ctgcgaacac catcccccat gtcttctgtg accttgctgc
181 cctgctcaag ctgtcctgct cagatatctt cctcaatgag ctggtcatgt tcacagtagg
241 ggtggtggtc attaccctgc cattcatgtg tatcctggta tcatatggct acattggggc
301 caccatcctg agggtcccct caaccaaagg gatccacaaa gcattgtcca catgtggctc
361 ccatctctct gtggtgtctc tctattatgg gtcaatattt ggccagtacc ttttcccgac
421 tgtaagcagt tctattgaca aggatgtcat tgtggctctc atgtacacgg tggtcacacc
481 catgttg (SEQ ID NO:236).

OR147

LOCUS AF179768 478 bp DNA PRI 31-DEC-2000
DEFINITION Homo sapiens HSA6 pseudogene, partial sequence.
ACCESSION AF179768

KEYWORDS .
SOURCE human.
ORGANISM Homo sapiens
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Homo.
REFERENCE 1 (bases 1 to 478)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 478)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..478
/organism="Homo sapiens"
/db_xref="taxon:9606"
gene <1..>478
/gene="HSA6"
/pseudo
BASE COUNT 89 a 128 c 103 g 158 t
ORIGIN
1 tgttgccatc tgtaaccctt tgcgctacct tacagtcatg aacccccagc tatgcctttg
61 gttggttctt gcctgctggt gtgggggttt tatccactct atcatgcagg tcatactagt
121 catccagctg cctttctgtg ggcccaatga actggacaac ttctactgtg atgtcctaca
181 aatcatcaag ctggcctgca tggacaccta tgtggtagag gtgctggtga tagccaacag
241 tggtctgctg tctcttgtct gcttcttggt cttactattc tcttatgcta tcatcctgat
301 caccctgaga acacgcttct gccagggcca gaacaaggtc ctctctacct gtgcttctca
361 cctgacagtg gtcagcctga tcttcgtgcc atgcgtattc atctatttga ggcctttctg
421 cagcttctct gtggataaga tattctcctt gttttacaca gtgattacac ctatgttg (SEQ ID NO:238).

OR148

LOCUS AF179769 488 bp DNA PRI 31-DEC-2000
DEFINITION Homo sapiens HSA7 pseudogene, partial sequence.
ACCESSION AF179769
KEYWORDS .
SOURCE human.
ORGANISM Homo sapiens
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Homo.
REFERENCE 1 (bases 1 to 488)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 488)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..488

/organism="Homo sapiens"
/db_xref="taxon:9606"
gene <1..>488
/gene="HSA7"
/pseudo
BASE COUNT 95 a 141 c 103 g 149 t
ORIGIN
1 catggccatc tgcaagccct tgttatatgg aagcaaaatg accaggtgtg tctgcctctg
61 tctggctgct gctccctata tttatggctt tgcaaatggt ctaagcacag accaccctga
121 tgcttcgtct gtccttctgt ggacccaatg acatcaacca cttttactgt gcggacccac
181 ccctcttagt cctcgcctgc tcagatactt atgtcaaaga gaccgccatg ttggtggtgg
241 ctggttccaa cctcatttgc tctctcaccg tcatcctcat ttcctacact ttcatcttca
301 ctgccattct gcgtatccac actgctgagg ggaggcgcaa ggccttctcc acctgcgggt
361 ctcatgtgac cgctgtcact gtcttctatg ggacactgtt ctgcatgtac ctgaggcccc
421 cttctgagac atctatacaa caggggaaaa ttgtagctgt tttttatatc tttgtgagtc
481 cgatgtta (SEQ ID NO:239).

OR149

LOCUS AF179770 487 bp DNA PRI 31-DEC-2000
DEFINITION Homo sapiens olfactory receptor (HSA8) gene, partial cds.
ACCESSION AF179770
KEYWORDS .
SOURCE human.
ORGANISM Homo sapiens
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Homo.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Homo sapiens"
/db_xref="taxon:9606"
gene <1..>487
/gene="HSA8"
CDS <1..>487
/gene="HSA8"
/codon_start=2
/product="olfactory receptor"
/translation="VAICKPLHYTSIMNRKLCTLLVLCAWLSGFLTIFPPLMLLLQLD
YCASNVIDHFACDYFPLLQLSCSDTWLLEVIGFYFALVTLLFTLALVILSYMYIIRTI
LRIPSASQRKKAFSTCSSHMIVISISYGSCIFMYANPSAKEKASLTKGIAILNTSVAP
ML" (SEQ ID NO:241).
BASE COUNT 115 a 119 c 80 g 173 t
ORIGIN
1 tgttgccatc tgcaagcccc ttcattacac atccatcatg aacaggaaac tctgcactct
61 acttgtgctg tgtgcctggc taagtgggtt tctgaccatt ttcccacccc ttatgcttct

121 cctccagctg gattactgtg cttccaacgt cattgatcac tttgcatgtg actattttcc
181 cctcttacaa ctatcttgtt cagatacatg gctcctagaa gtaattggtt tttactttgc
241 tttggttact ttgctgttca ctttggcatt agtgatttta tcttacatgt acattatcag
301 gaccattttg agaatcccgt ctgccagtca aagaaaaaag gctttctcca cttgttcttc
361 tcacatgatt gtcatttcca tttcttatgg aagctgtata ttcatgtatg ctaatccatc
421 tgcaaaagaa aaggcatcat tgacaaaagg aatagctatt ctcaatacat ctgttgcccc
481 catgctg (SEQ ID NO:240).

OR150

LOCUS AF179771 485 bp DNA PRI 31-DEC-2000
DEFINITION Eulemur fulvus olfactory receptor (EFU145) gene, partial cds.
ACCESSION AF179771
KEYWORDS .
SOURCE Eulemur fulvus.
ORGANISM Eulemur fulvus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.
REFERENCE 1 (bases 1 to 485)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 485)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..485
/organism="Eulemur fulvus"
/db_xref="taxon:13515"
gene <1..>485
/gene="EFU145"
CDS <1..>485
/gene="EFU145"
/codon_start=2
/product="olfactory receptor"
/translation="VAICQPLQYSTAMSHQLCALMLAMCWLLTNCPALMHTLLLTRVA
FCAQRAIPHFYCDPSALLKLACSDTRINELMIIAMGLAFLTVPLTLIVFSYVRISWAV
LGISSPGGRCKAFSTCGSHLTVVLLFYGSLMGVYLLPPSSYSTERESRAAILYMVIIP
M" (SEQ ID NO:243).
BASE COUNT 78 a 155 c 114 g 138 t
ORIGIN
1 tgtggccatc tgccagccac tccaatacag cacagctatg agtcaccagc tctgtgcact
61 catgctggcc atgtgctggc tgctaaccaa ctgtcctgca ttgatgcaca cgctgttgct
121 gacccgtgtg gctttctgtg cccagagggc catcccccac ttctactgtg atcccagtgc
181 tctcctgaag ctcgcctgct cggatacccg cataaacgag ctgatgatca tcgccatggg
241 cttggccttc ctcacggttc ccctcacgct gatcgtcttc tcctacgtcc gcatctcctg
301 ggctgtgctt ggcatctcgt ctcctggagg gcgatgcaaa gccttctcca cctgtggttc
361 tcatctcacg gtggttctgc tcttctatgg gtctcttatg ggtgtgtatt tgcttcctcc
421 gtcatcttac tctacagaga gggaaagcag ggctgccatt ctctacatgg tgatcattcc
481 catgt (SEQ ID NO:242).

OR151

LOCUS AF179772 485 bp DNA PRI 31-DEC-2000
DEFINITION Eulemur fulvus EFU146 pseudogene, partial sequence.
ACCESSION AF179772
KEYWORDS .
SOURCE Eulemur fulvus.
ORGANISM Eulemur fulvus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.
REFERENCE 1 (bases 1 to 485)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 485)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..485
/organism="Eulemur fulvus"
/db_xref="taxon:13515"
gene <1..>485
/gene="EFU146"
/pseudo
BASE COUNT 98 a 145 c 110 g 132 t
ORIGIN
1 cgttgccatc tgcaagcccc tccactaccc ggtgctcatg agcagcaggg tctgcacaca
61 gctcatcctc gcctgctggc tggcagggtt ctccttcatc attgtgcctg tcatcctgac
121 cagtcagctt ccattctgtg acacccacat caaccacttc ttctgtgact atacacctct
181 aatggaggtg gtctgcagtg ggccaaaggt gctggagatg gtggatttta ccctggcctt
241 ggtggcaccg ctcagcacct tggtgctgat caccctgtcc tacatccaga tcatcagcac
301 gattgtcagg atcccctctg tccaggagag gaaaaaggct ttctccacct gttcctccca
361 tgtcatcgtg gttaccatgt gctatggaaa gctgtttttt tatgtatgtc aagccctccc
421 caggcaaagg ggttgatcta aacaaaggag tgtctctaat caatacagtt attgcccccc
481 tcttg (SEQ ID NO:244).

OR152

LOCUS AF179773 487 bp DNA PRI 31-DEC-2000
DEFINITION Eulemur fulvus olfactory receptor (EFU147) gene, partial cds.
ACCESSION AF179773
KEYWORDS .
SOURCE Eulemur fulvus.
ORGANISM Eulemur fulvus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Eulemur fulvus"
/db_xref="taxon:13515"
gene <1..>487
/gene="EFU147"
CDS <1..>487
/gene="EFU147"
/codon_start=2
/product="olfactory receptor"
/translation="VAICLPLHYTMVMKPRCCLMLVAASWLCSHCLAFSLTLLMTQFS
FCASHSIQHFFCDVPPLLKLACSDTHIFQVTMLTEGVLSGVIPLTCVLVSYAHIMHTI
LRIPSAGGKHKVFSTCGSHLSVVTLFYGTLFLVYFQPSSSYSADTGMVACVVYTMVTP
MV" (SEQ ID NO:246).
BASE COUNT 86 a 161 c 93 g 147 t
ORIGIN
1 cgtggccatc tgccttcctc tgcactacac catggtcatg aaaccccgat gctgcctgat
61 gctggtggca gcatcctggc tctgctccca ctgcctggct ttctctctca cccttctgat
121 gactcagttc tcattctgtg cctcccattc catccaacac tttttctgtg atgtaccccc
181 actcctcaaa cttgcctgtt cagacaccca tatctttcag gtcacaatgt taactgaagg
241 agtcctctca ggtgtgatcc ctcttacctg tgtcctggtc tcttatgccc acatcatgca
301 caccatcctc aggatccctt ctgctggggg caagcacaaa gtcttctcta cctgtggctc
361 tcacctgtca gtggtcactc tcttctatgg gaccctcttt ctggtgtatt tccagccttc
421 atcctcctac tcagcagata ctggaatggt ggcatgtgta gtatacacga tggtcacccc
481 catggtg (SEQ ID NO:245).

OR153

LOCUS AF179774 487 bp DNA PRI 31-DEC-2000
DEFINITION Eulemur fulvus olfactory receptor (EFU148) gene, partial cds.
ACCESSION AF179774
KEYWORDS .
SOURCE Eulemur fulvus.
ORGANISM Eulemur fulvus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia; Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse: Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Eulemur fulvus"
/db_xref="taxon:13515"
gene <1..>487
/gene="EFU148"

CDS <1..>487
/gene="EFU148"
/codon_start=2
/product="olfactory receptor"
/translation="VAICKPLHYVAIMSNTVCRRLVFCCWVAGLFIIIPPLSLGLNLE
FCDSDTIDHFICDASPLLNISCSNTWFMEQTVIICAVLTLIMTLMCVVLSYIYIIKTI
LGFSSAQQKKKAFSTCSSHMIVVSITYGSYIFIYIKPSAKEEVAINKGVTVLTTSIAP
ML" (SEQ ID NO:248).
BASE COUNT 118 a 118 c 88 g 163 t
ORIGIN
1 tgtggccatc tgcaaaccgc tgcattatgt ggccattatg agtaacacag tctgcagaag
61 acttgtcttt tgttgttggg tagctggtct gtttattata atccctccac ttagcctggg
121 cctaaatctg gaattttgtg attctgatac cattgatcat tttatctgtg atgcatctcc
181 cctcctgaat atctcttgtt caaatacttg gttcatggaa cagactgtta tcatctgtgc
241 agtgctgacc ctcattatga cacttatgtg tgtagttctg tcctacattt atatcatcaa
301 gacaatttta ggattctctt ctgcccagca aaagaaaaaa gccttttcca cctgttcttc
361 ccacatgatt gtggtgtcca tcacctatgg cagctacatc ttcatctata tcaaaccttc
421 tgcaaaggaa gaagtagcca ttaacaaggg tgtgacagtc ctcactactt ccatcgcccc
481 catgctg (SEQ ID NO:247).

OR154

LOCUS AF179775 487 bp DNA PRI 31-DEC-2000
DEFINITION Eulemur fulvus olfactory receptor (EFU149) gene, partial cds.
ACCESSION AF179775
KEYWORDS .
SOURCE Eulemur fulvus.
ORGANISM Eulemur fulvus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Eulemur fulvus"
/db_xref="taxon:13515"
gene <1..>487
/gene="EFU149"
CDS <1..>487
/gene="EFU149"
/codon_start=2
/product="olfactory receptor"
/translation="VAICKPLHYRVIMNRRVCTLLVFASWLVSFLIVFPALMLLLKLD
YCGFNIIDHFTCDYFPLLQLSCSDTKFLEIMGFSCAVFTLMFTLALIFLSYMHIVRTI
LRIPSTSQRTKAFSTCSSHMIVISISYGSCIFMYIKPSAKDRVSLSKAVAVLITSVAP
ML" (SEQ ID NO:250).
BASE COUNT 109 a 113 c 91 g 174 t

ORIGIN
1 tgttgctatc tgtaagcccc tgcattacag ggtcatcatg aatcgaagag tctgcacact
61 gctcgtcttt gcctcttggc tggtttcatt cttaatcgta ttcccagcac tcatgttgct
121 cttaaagctt gattactgtg gatttaatat tattgaccat tttacctgtg attattttcc
181 cctgctgcag ctttcctgtt cagatacaaa attcctggag ataatggggt tttcctgtgc
241 tgtgtttact ctaatgttca ctttggcatt aatatttctg tcctacatgc acatcgtgag
301 aacgattttg agaattcctt ctactagtca gaggacaaag gccttttcta catgttcttc
361 ccacatgatt gtcatctcca tctcttatgg cagctgcatt tttatgtaca ttaagccctc
421 agcaaaggat agagtatctt tgagcaaggc agtggctgtg ctaatcacct cagtagctcc
481 catgctc (SEQ ID NO:249).

OR155

LOCUS AF179776 484 bp DNA PRI 31-DEC-2000
DEFINITION Eulemur fulvus EFU150 pseudogene, partial sequence.
ACCESSION AF179776
KEYWORDS .
SOURCE Eulemur fulvus.
ORGANISM Eulemur fulvus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.
REFERENCE 1 (bases 1 to 484)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 484)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..484
/organism="Eulemur fulvus"
/db_xref="taxon:13515"
gene <1..>484
/gene="EFU150"
/pseudo
BASE COUNT 80 a 157 c 112 g 135 t
ORIGIN
1 tctggctatc tgctatcctc tacactacgg gacaatcatg agcagcctgc tggctgcaca
61 gctggccttg ggctcctggg tctgtggttt cctggccatt gcagtgctga cggcccttat
121 cagtggcctg tccttctgtg gcgcccgtgc catcaatcac ttcttctgtg acattgcacc
181 ctggatcgcc ctggcctgta ccagcacaca ggcaatagag ctcgtggcct ttgtgattgc
241 ttttgtggtc atcctgagtt catgcctcat caccctggtc tcctacgtgt acattatcag
301 caccatcctc aggatcccat ctgccagcgg cggagcaaag ccttctctac gtgctcctct
361 cacctcaccg tggtgctcat ctggtatggg tccacgattt ttcttcatgt ccgcacctcc
421 atcacagacg ccttggatct gaccaaagct gtccatgtcc tgaacaccgt ggtgactcca
481 gttc (SEQ ID NO:251).

OR156

LOCUS AF179777 487 bp DNA PRI 31-DEC-2000
DEFINITION Eulemur fulvus olfactory receptor (EFU151) gene, partial cds.
ACCESSION AF179777

KEYWORDS .
SOURCE Eulemur fulvus.
ORGANISM Eulemur fulvus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Eulemur fulvus"
/db_xref="taxon:13515"
gene <1..>487
/gene="EFU151"
CDS <1..>487
/gene="EFU151"
/codon_start=2
/product="olfactory receptor"
/translation="LAICYPLHYRTIMSSLLATQLALGSWVCGFLAIAVLTALISGLS
FCGARAINHFFCDIAPWIALACTSTQAIELVAFVIAFVVILSSCLITLVSYVYIISTI
LRIPSAGRSKAFSTCSSHLTVVLIWYGSTIFLHVRTSITDALDLTKAVHVLNTVVTP
VL" (SEQ ID NO:253).
BASE COUNT 83 a 159 c 110 g 135 t
ORIGIN
1 tctggctatc tgctatcctc tacactacag gacaatcatg agcagcctgc tggctacaca
61 gctggccttg ggctcctggg tctgtggttt cctggccatt gcagtgctga cggcccttat
121 cagtggcctg tccttctgtg gcgcccgtgc catcaaccac ttcttctgtg acattgcacc
181 ctggattgcc ctggcctgca ccagcacaca ggcaatagag ctcgtggcct ttgtgattgc
241 ttttgtggtc atcctgagtt catgcctcat caccctggtc tcctacgtgt acattatcag
301 caccatcctc aggatcccat ctgccagcgg ccggagcaaa gccttctcta cgtgctcctc
361 tcacctcacc gtggtgctca tctggtatgg gtccacgatt tttcttcatg tccgcacctc
421 catcacagac gccttggatc tgaccaaagc tgtccatgtc ctgaacaccg tggtgactcc
481 agttcta (SEQ ID NO:252).

OR157

LOCUS AF179778 487 bp DNA PRI 31-DEC-2000
DEFINITION Eulemur fulvus olfactory receptor (EFU153) gene, partial cds.
ACCESSION AF179778
KEYWORDS .
SOURCE Eulemur fulvus.
ORGANISM Eulemur fulvus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Eulemur fulvus"
/db_xref="taxon:13515"
gene <1..>487
/gene="EFU153"
CDS <1..>487
/gene="EFU153"
/codon_start=2
/product="olfactory receptor"
/translation="VAICKPLHYRVIMNRRVCTLLVFASWLVSFLIVFPALMLLLKLD
YCGFNIIDHFTCDYFPLLQLSCSDTKFLEIMGFSCAVFTLMFTLALIFLSYMHIVRTI
LRIPSTSQRTKAFSTCSSHMIVISISYGSCIFMYIKPSAKDRVSLSKAVAVLITSVAP
ML" (SEQ ID NO:255).
BASE COUNT 109 a 113 c 91 g 174 t
ORIGIN
1 tgttgctatc tgtaagcccc tgcattacag ggtcatcatg aatcgaagag tctgcacact
61 gctcgtcttt gcctcttggc tggtttcatt cttaatcgta ttcccagcac tcatgttgct
121 cttaaagctt gattactgtg gatttaatat tattgaccat tttacctgtg attattttcc
181 cctgctgcag ctttcctgtt cagatacaaa attcctggag ataatggggt tttcctgtgc
241 tgtgtttact ctaatgttca ctttggcatt aatatttctg tcctacatgc acatcgtgag
301 gacgattttg agaattcctt ctactagtca gaggacaaag gccttttcta catgttcttc
361 ccacatgatt gtcatctcca tctcttatgg cagctgcatt tttatgtaca ttaagccctc
421 agcaaaagat agagtatctt tgagcaaggc agtggctgtg ctaatcacct cagtagctcc
481 catgctc (SEQ ID NO:254).

OR158

LOCUS AF179779 488 bp DNA PRI 31-DEC-2000
DEFINITION Eulemur fulvus olfactory receptor (EFU154) gene, partial cds.
ACCESSION AF179779
KEYWORDS .
SOURCE Eulemur fulvus.
ORGANISM Eulemur fulvus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia; Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.
REFERENCE 1 (bases 1 to 488)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse: Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 488)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..488
/organism="Eulemur fulvus"

/db_xref="taxon:13515"
gene <1..>488
/gene="EFU154"
CDS <1..>488
/gene="EFU154"
/codon_start=2
/product="olfactory receptor"
/translation="MAICHPLRYPVFMNHRVCLFLASGCWFLGSVDGFMLTPITMTFP
YCRSREIHHSFCEVPAVTTLSCSDTSLYEMLMYLCCVLMLLIPVTVISSSYSFILLTI
HRMGSAEGRKKAFATCSSHMTVVILFYGAAIYTYMLPSSYHTPEKDMMVSVFYTILTP
VL" (SEQ ID NO:257).
BASE COUNT 92 a 163 c 95 g 138 t
ORIGIN
1 catggccatc tgccatccgc tccgttaccc tgtcttcatg aaccacaggg tgtgtctctt
61 cctggcatct ggctgctggt tcctgggatc agtagatggc ttcatgctca ctccaatcac
121 catgaccttc ccctactgca ggtcccggga gattcaccat tccttctgcg aagtccctgc
181 tgtaacgacg ctttcctgct cagacacctc actctatgaa atgctcatgt acctgtgctg
241 tgtcctcatg ctcctcattc ctgtgacagt catttcaagc tcctattcat tcattctcct
301 caccatccac aggatgggct cagcagaggg ccggaagaag gcctttgcca cctgttcctc
361 ccacatgacc gtggttatcc tcttctatgg ggccgccatc tacacctaca tgctccccag
421 ctcctaccac actcctgaga aggacatgat ggtgtctgtc ttttatacca tcctaactcc
481 tgtgctaa (SEQ ID NO:256).

OR159

LOCUS AF179780 488 bp DNA PRI 31-DEC-2000
DEFINITION Eulemur fulvus EFU155 pseudogene, partial sequence.
ACCESSION AF179780
KEYWORDS .
SOURCE Eulemur fulvus.
ORGANISM Eulemur fulvus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.
REFERENCE 1 (bases 1 to 488)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 488)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..488
/organism="Eulemur fulvus"
/db_xref="taxon:13515"
gene <1..>488
/gene="EFU155"
/pseudo
BASE COUNT 111 a 113 c 91 g 173 t
ORIGIN
1 tgttgctatc tgtaagcccc tgcattacaa ggtcatcatg aatcgaagag tcgtgcacac
61 tgctcgtctt tgcctcttgg ctggtttcat tcttaatcgt attcccagca ctcatgttgc
121 tcttaaagct tgattactgt ggatttaata ttattgacca ttttacctgt gattattttc

181 ccctgctgca gctttcctgt tcagatacaa aattcctgga gataatgggg ttttcctgtg
241 ctgtgtttac tctaatgttc actttggcat taatatttct gtcctacatg cacatcgtga
301 gaacgatttt gagaattcct tctactagtc agaggacaaa ggccttttct acatgttctt
361 cccacatgat tgtcatctcc atctcttatg gcagctgcat ttttatgtac attaagccct
421 cagcaaagga tagagtatct ttgagcaagg cagtggctgt gctaatcacc tcagtagctc
481 ccatgcac (SEQ ID NO:258).

OR160

LOCUS AF179781 486 bp DNA PRI 31-DEC-2000
DEFINITION Eulemur fulvus EFU156 pseudogene, partial sequence.
ACCESSION AF179781
KEYWORDS .
SOURCE Eulemur fulvus.
ORGANISM Eulemur fulvus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.
REFERENCE 1 (bases 1 to 486)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 486)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..486
/organism="Eulemur fulvus"
/db_xref="taxon:13515"
gene <1..>486
/gene="EFU156"
/pseudo
BASE COUNT 119 a 110 c 93 g 164 t
ORIGIN
1 tgtggccatc tgcaagcccc tgcattatgt gaccgtcatg aacagcagag tttgcaggat
61 tctcatcatc tgttgttggg tggctggttt atgcataata atccctccac ttagcctggg
121 tttaaatcta aaattctgtg actctaacat gattgatcat tttggttgcg atgcatttcc
181 cctggtgaaa atctcatgct cagacacatg gttcatggaa cagacggtta tcatctgtgc
241 tgtgctgacc ctgaatatga ctctaacttg tgtagttctg tcatacgctt acatcatcaa
301 gacaattttt agattccctt ctgtccagca aaggaaaaag gccttttcca cctgttcttc
361 ccacatgatt gtggtttcca tcacctatgg cacgtgcatt ttcatctaca tgaatcctac
421 agcaaaggaa gaagtgaccg ttaataaagt agtttctttg ctcatttctt ctattttgct
481 acattg (SEQ ID NO:259).

OR161

LOCUS AF179782 486 bp DNA PRI 31-DEC-2000
DEFINITION Eulemur rubriventer ERU157 pseudogene, partial sequence.
ACCESSION AF179782
KEYWORDS .
SOURCE Eulemur rubriventer.
ORGANISM Eulemur rubriventer
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.
REFERENCE 1 (bases 1 to 486)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 486)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..486
/organism="Eulemur rubriventer"
/db_xref="taxon:34829"
gene <1..>486
/gene="ERU157"
/pseudo
BASE COUNT 78 a 157 c 112 g 139 t
ORIGIN
1 cgtggccatc tgccagccac cccaatacag cacagctatg agtccccagc tctgtgcact
61 catgctggcc atgtgctggc tgctaaccag ctgtcctgcg ttgatgcaca cgctgttgct
121 gacccgtgtg gctttctgtg cccagaaggc catcccccac ttctactgtg atcccagtgc
181 tctcctgaag ctcgcctgct cggatacccg cataaatgag ctgatgatca tcgccatggg
241 cttgacgttc ctcactattc ccctcacact gatcgtcttc tcctacgtcc gcatctcctg
301 ggctgtgctt ggcatctcgt ctcctggcgg gcgatgcaag gccttctcca cctgtggttc
361 tcatctcacg gtggttctgc tcttctatgg gtctcttatg ggtgtgtatt tgcttcctcc
421 gtcatcttac tctacagaga gggaaagcag gctgccattc tctacatggt gatcattccc
481 atgtta (SEQ ID NO:260).

OR162

LOCUS AF179783 484 bp DNA PRI 31-DEC-2000
DEFINITION Eulemur rubriventer ERU159 pseudogene, partial sequence.
ACCESSION AF179783
KEYWORDS .
SOURCE Eulemur rubriventer.
ORGANISM Eulemur rubriventer
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.
REFERENCE 1 (bases 1 to 484)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 484)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..484
/organism="Eulemur rubriventer"
/db_xref="taxon:34829"
gene <1..>484

/gene="ERU159"
/pseudo
BASE COUNT 123 a 103 c 94 g 164 t
ORIGIN
1 tgtggccatc tgcaacccac tgaggtatcc catcatcatg aacagggtgt tataagtgca
61 aatggctgca tggtcttgga tcataggcta tctgatctcc ttagtgcaaa cagtcttgac
121 aatgatattg cctttctgtg gcaataatgt cattgatcat attacctgtg agatcctggc
181 tcttaaactc atatgctcag atatttccat gaatgtgctt atcatggcag tggcaagtat
241 tgttatattg gtgattcctc tgctgttcat ttttatctcc tatgtattca tcctctcttc
301 catcctgaga attaattctt ctgaggggag aaagaaagcc tttgcaacct gttcagccca
361 cctgactgtg gtcatcttat tctatggttc agctcttttt atgtacatga agcctaagtc
421 aaagtacaca aaagtatctg atgaaatcat tgcactgtct tacggagtag taaccccaat
481 gttg (SEQ ID NO:261).

OR163

LOCUS AF179784 487 bp DNA PRI 31-DEC-2000
DEFINITION Eulemur rubriventer olfactory receptor (ERU160) gene, partial cds.
ACCESSION AF179784
KEYWORDS .
SOURCE Eulemur rubriventer.
ORGANISM Eulemur rubriventer
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Eulemur rubriventer"
/db_xref="taxon:34829"
gene <1..>487
/gene="ERU160"
CDS <1..>487
/gene="ERU160"
/codon_start=2
/product="olfactory receptor"
/translation="VAICHPLHYTTIMREELCTLLVAISWLLSCASSLSHTLLLTRLS
FCAANVIPNFFCDLAALLKLSCSDIFLNELVMFTVGVVVITLPFLCILVSYGYIGATI
LRVPSTKGICKALSTCGSHLSVVSLYYGAIFGQYLFPALSNSIDKDIIVAMMYTVVTP
ML" (SEQ ID NO:263).
BASE COUNT 91 a 143 c 104 g 149 t
ORIGIN
1 tgttgccata tgtcaccctc tccactacac caccatcatg agggaagagc tctgcacctt
61 attggtggct atatcctggc tcctgtcttg tgccagctcc ctctcccaca cccttctcct
121 gacccggctg tccttctgtg ctgctaatgt cattcccaac ttcttctgtg accttgctgc
181 tctgctcaag ctgtcctgct cagacatctt cctcaatgag ctggtcatgt ttacagtagg
241 ggtggtggtc attaccttgc cattcttatg tatcctggta tcttacggct acattggggc

301 caccatcctg agggtccctt caaccaaagg gatctgcaaa gcattatcca cgtgtgggtc
361 ccatctctct gtggtgtctc tgtactacgg ggcaatattt gggcagtacc ttttcccagc
421 attaagcaat tccattgaca aggacatcat tgtggctatg atgtacacgg tggtcacacc
481 catgttg (SEQ ID NO:262).

OR164

LOCUS AF179785 475 bp DNA PRI 31-DEC-2000
DEFINITION Eulemur rubriventer olfactory receptor (ERU161) gene, partial cds.
ACCESSION AF179785
KEYWORDS .
SOURCE Eulemur rubriventer.
ORGANISM Eulemur rubriventer
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.
REFERENCE 1 (bases 1 to 475)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 475)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..475
/organism="Eulemur rubriventer"
/db_xref="taxon:34829"
gene <1..>475
/gene="ERU161"
CDS <1..>475
/gene="ERU161"
/codon_start=2
/product="olfactory receptor"
/translation="VAICKPLHYMNIMSRQLCHLLVAGSWLGGFLHSIIQIFITIQSP
FCGPNVIDHYFCDLLPLFKLACTDTFVEGLTVLANSGLIPVCSLFILVSSYIIILVHL
RKHSAEGRHKALSTCASHITVVILFFGPAIFLYMRPSSTFTEDKLMGVLYTVITPS" (SEQ ID
NO:265).
BASE COUNT 92 a 133 c 97 g 153 t
ORIGIN
1 cgtggcaatc tgcaagcctc ttcattacat gaatattatg agtcgtcaac tgtgtcacct
61 tctggtggct ggttcctggc tgggaggctt tcttcactct attattcaga tttttatcac
121 catccaatcg ccctttttgtg gtcccaacgt gattgaccac tacttctgtg acctcctgcc
181 attattcaag cttgcctgca ccgacacctt tgtagagggg ctgactgtgt tggccaatag
241 tggcttaatt cccgtgtgct ccctgtttat cctggtgtcc tcctatatca ttattctggt
301 gcacttgagg aaacattctg cagaggggag gcacaaagcc ctctctacct gtgcctctca
361 catcacggtg gtcattttgt tttttggacc tgccatcttc ctctacatgc gaccttcctc
421 taccttcaca gaagacaaac tcatgggtgt gttgtacaca gtcatcaccc ccagt (SEQ ID NO:264).

OR165

LOCUS AF179786 487 bp DNA PRI 31-DEC-2000
DEFINITION Eulemur rubriventer olfactory receptor (ERU162) gene, partial cds.
ACCESSION AF179786

KEYWORDS .
SOURCE Eulemur rubriventer.
ORGANISM Eulemur rubriventer
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Eulemur rubriventer"
/db_xref="taxon:34829"
gene <1..>487
/gene="ERU162"
CDS <1..>487
/gene="ERU162"
/codon_start=2
/product="olfactory receptor"
/translation="VAISNPPLYVQAMPRKLCICFIICSYTGGFVNAIILTSNTFTLD
FCGDNVIDDFFCDVPPLVKLACDVEGSYQAVLYFLLASNVISPAMLILASYVFIIAAV
LRVRSSRGRLKAFSTCSSHLISVTLYYGSILYIYSRPSSSYSLERDKMVSTFYTVLFP
TL" (SEQ ID NO:267).
BASE COUNT 91 a 158 c 98 g 140 t
ORIGIN
1 tgtggccatc tccaaccccc cgctctatgt tcaggccatg ccaaggaaac tgtgcatctg
61 tttcattatc tgttcataca ctggaggctt tgttaatgca ataatattaa ccagcaacac
121 attcacgttg gatttttgtg gtgacaatgt catcgacgac tttttctgtg atgtcccacc
181 cctggtgaag ttggcctgtg atgtggaagg gagctaccag gctgtgctgt acttcctcct
241 ggcctccaac gtcatctccc cggccatgct catcctcgcc tcctacgtct tcatcatcgc
301 agcagtcttg agggtccgct ccagccgggg ccgcctcaag gccttctcca cgtgctcctc
361 ccacctgatc tctgttacct tatactacgg ctccattctc tacatctact ctcgcccaag
421 ttccagctat tccctcgaga gggacaaaat ggtctctacc ttttacaccg tgctgttccc
481 cacgctc (SEQ ID NO:266).

OR166

LOCUS AF179787 478 bp DNA PRI 31-DEC-2000
DEFINITION Eulemur rubriventer olfactory receptor (ERU163) gene, partial cds.
ACCESSION AF179787
KEYWORDS .
SOURCE Eulemur rubriventer.
ORGANISM Eulemur rubriventer
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.
REFERENCE 1 (bases 1 to 478)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

JOURNAL Unpublished
REFERENCE 2 (bases 1 to 478)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..478
/organism="Eulemur rubriventer"
/db_xref="taxon:34829"
gene <1..>478
/gene="ERU163"
CDS <1..>478
/gene="ERU163"
/codon_start=2
/product="olfactory receptor"
/translation="VAVCNPLHYLTVMNRQLCLQLVFACWCGGFIHSVTQVILVIQLP
FCGPNKLDSFYCDVPEVIKLACLDTYVVEVLMVTNSGLLSLVCFLVLIFSYATILTTL
RTRLHQGQSKAFSTCASHLMVVSLIFVPCVFIYLRPFCSFSVDKIFSVFYMVITPML" (SEQ ID NO:269).
BASE COUNT 85 a 132 c 108 g 153 t
ORIGIN
1 tgttgccgta tgtaaccctt tgcattacct gacggtcatg aaccgccagc tctgccttca
61 gttggttttt gcctgctggt gtgggggttt catccactct gtcacacagg ttatactggt
121 catccagctg cccttctgtg gccccaacaa attggacagt ttctactgtg atgtcccaga
181 ggtcatcaag ctggcctgcc tggacaccta tgtggtagaa gtgctgatgg ttaccaacag
241 tggtctgcta tctcttgtct gcttcttggt cttgatattc tcttatgcca ccatcctgac
301 caccctgaga actcgcctcc accagggcca gagcaaggcc ttctctacct gtgcctccca
361 cctaatggtg gtcagcctga tctttgtgcc atgtgtattc atctacttga ggcctttctg
421 cagcttctct gtggataaga tattctctgt gttttacatg gtgatcacac ctatgttg (SEQ ID NO:268).

OR167

LOCUS AF179788 487 bp DNA PRI 31-DEC-2000
DEFINITION Eulemur rubriventer olfactory receptor (ERU164) gene, partial cds.
ACCESSION AF179788
KEYWORDS .
SOURCE Eulemur rubriventer.
ORGANISM Eulemur rubriventer
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Eulemur rubriventer"
/db_xref="taxon:34829"

gene <1..>487
/gene="ERU164"
CDS <1..>487
/gene="ERU164"
/codon_start=2
/product="olfactory receptor"
/translation="VAICKPLHYTTIISTRVCILLVCSSWLAGFLIIFPPIILLLQLD
FCASNIIDHFICDSSPILQLSCTNTHFLELMAFCLAVVTLMVTLTLVILSYTNIIRTI
LRIPSMSQRKKAFSTCSSHIIVVSLSYGSCIFMYIKPSTRERVTLSKGVAVVNTSVAP
LL" (SEQ ID NO:271).
BASE COUNT 116 a 116 c 79 g 176 t
ORIGIN
1 tgtggccatc tgcaaacctc ttcattacac aaccatcatt agcaccaggg tttgtatcct
61 tcttgtctgt agctcctggc ttgcaggatt cttgatcatc tttccaccaa taatccttct
121 tctgcagttg gacttctgtg cctccaatat aattgatcat tttatctgtg attcttctcc
181 aattctgcag ctttcttgta caaacactca ctttctagaa ctcatggcat tttgtttagc
241 cgtggtgaca ctcatggtca ccttgacctt agttattctc tcctatacaa atattatccg
301 gacaattcta agaattcctt ctatgagtca aaggaaaaaa gccttttcca cttgttcctc
361 ccatataata gttgtttccc tctcttatgg tagttgtatc ttcatgtaca taaagccttc
421 tacaagggaa agggtgactt taagcaaagg agtagctgtg gttaatactt cagtggctcc
481 tcttttg (SEQ ID NO:270).

OR168

LOCUS AF179789 483 bp DNA PRI 31-DEC-2000
DEFINITION Eulemur rubriventer ERU165 pseudogene, partial sequence.
ACCESSION AF179789
KEYWORDS .
SOURCE Eulemur rubriventer.
ORGANISM Eulemur rubriventer
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.
REFERENCE 1 (bases 1 to 483)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 483)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..483
/organism="Eulemur rubriventer"
/db_xref="taxon:34829"
gene <1..>483
/gene="ERU165"
/pseudo
BASE COUNT 98 a 144 c 108 g 133 t
ORIGIN
1 cgttgccatc tgcaagcccc tccactaccc ccgtgctcat gagcagcagg gtctgcacac
61 agctcatcct cgcctgctgg ctggcagggt tctccttcat cattgtgcct gtcatcctga
121 ccagtcagct tccattctgt gacacccaca tcaaccactt cttctgtgac tatacacctc
181 taatggaggt ggtctgcagt gggccaaagg tgctggagat ggtggatttt accctggcct

241 tggtggcact gctcagcacc ttggtgctga tcaccctgtc ctacatccag atcatcagga
301 cgattgtcag gatcccctct gtccaggaga ggaaaaaggc tttctccacc tgttcctccc
361 atgtcatcgt ggttaccatg tgctatggaa gctgtttttt tatgtatgtc aagccctccc
421 caggcaaagg ggttgatcta aacaaaggag tgtcttaatc aatacaatta ttgccccccct
481 ctt (SEQ ID NO:272).

OR169

LOCUS AF179790 486 bp DNA PRI 31-DEC-2000
DEFINITION Eulemur rubriventer olfactory receptor (ERU167) gene, partial cds.
ACCESSION AF179790
KEYWORDS .
SOURCE Eulemur rubriventer.
ORGANISM Eulemur rubriventer
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.
REFERENCE 1 (bases 1 to 486)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 486)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..486
/organism="Eulemur rubriventer"
/db_xref="taxon:34829"
gene <1..>486
/gene="ERU167"
CDS <1..>486
/gene="ERU167"
/codon_start=2
/product="olfactory receptor"
/translation="VAICHPLRYTDIMTPRLCGLLVSLSLSICSADALLHSLMLLQLS
FCTDLEISLFFCEVVQVVKLACSDTLVNNLLIYFAACTLGGIPLSGIIFSYTQIATSI
LKMPSSGRKYKAFSTCGSHLSVVSLFYGTGLGVYISSAVSDSSRRTAVASVMYTVVTP
C" (SEQ ID NO:274).
BASE COUNT 83 a 139 c 107 g 157 t
ORIGIN
1 tgtggccatc tgtcaccctc tgagatacac agacatcatg actcctcgtc tgtgtggtct
61 gctggtttca ctttccctgt ccatttgctc cgcggatgcc ctgctccaca gcctcatgct
121 gctgcagctg tccttctgca cagaccttga aatctccctt ttcttctgtg aagtcgttca
181 ggtcgtcaag ctcgcgtgct ccgataccct cgtcaacaac cttctgatct attttgcagc
241 ttgcaccttg ggtggcattc ctctgtctgg catcattttt tcttacactc aaatagccac
301 ctccattttg aaaatgccgt catcgggcag aaagtataaa gccttttcca cctgtgggtc
361 tcacctgtca gttgtttccc tgttctatgg gacaggtttg ggggtgtaca tcagttctgc
421 agtttctgac tcttcaagga ggactgcggt ggcttcagtg atgtacactg tggtcactcc
481 ctgttg (SEQ ID NO:273).

OR170

LOCUS AF179791 487 bp DNA PRI 31-DEC-2000

DEFINITION Eulemur rubriventer olfactory receptor (ERU168) gene, partial cds.
ACCESSION AF179791
KEYWORDS .
SOURCE Eulemur rubriventer.
ORGANISM Eulemur rubriventer
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Eulemur rubriventer"
/db_xref="taxon:34829"
gene <1..>487
/gene="ERU168"
CDS <1..>487
/gene="ERU168"
/codon_start=2
/product="olfactory receptor"
/translation="VAICHPLTYTDIMTPRLCGLLVSLSLSICSADALLHSLMLLQLS
FCTDLEISLFFCEVVQVVKLACSDTLVNNLLIYFAACTLGGIPLSGIIFSYTQIATSI
LKMPSSGRKYKAFSACGSHLSVVSLFYGTGLGVYISSAVSDSSRRTAVASVMYTVVTP
VL" (SEQ ID NO:276).
BASE COUNT 82 a 140 c 108 g 157 t
ORIGIN
1 tgtggccatc tgtcaccctc tgacatacac agacatcatg actcctcgtc tgtgtggtct
61 gctggtttca ctttccctgt ccatttgctc cgcggatgcc ctgctccaca gcctcatgct
121 gctgcagctg tccttctgca cagaccttga aatctccctt ttcttctgtg aagtcgttca
181 ggtcgtcaag ctcgcgtgct ccgataccct cgtcaacaac cttctgatct attttgcagc
241 ttgcaccttg ggtggcattc ctctgtctgg catcattttt tcttacactc aaatagccac
301 ctccattttg aaaatgccgt catcgggcag aaagtataaa gccttttccg cctgtgggtc
361 tcacctgtca gttgtttccc tgttctatgg gacaggtttg ggggtgtaca tcagttctgc
421 agtttctgac tcttcaagga ggactgcggt ggcttcagtg atgtacactg tggtcactcc
481 cgtgttg (SEQ ID NO:275).

OR171

LOCUS AF179792 486 bp DNA PRI 31-DEC-2000
DEFINITION Macaca sylvanus olfactory receptor (MSY172) gene, partial cds.
ACCESSION AF179792
KEYWORDS .
SOURCE Barbary ape.
ORGANISM Macaca sylvanus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Macaca.
REFERENCE 1 (bases 1 to 486)

AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 486)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..486
/organism="Macaca sylvanus"
/db_xref="taxon:9546"
gene <1..>486
/gene="MSY172"
CDS <1..>486
/gene="MSY172"
/codon_start=1
/product="olfactory receptor"
/translation="PAICQPLRYRVLMNHRLCVLLVGAAWVLCLLKSVTETVIAMRLP
FCGHHVVSHFTCEILAVLKLTCGNTSVSEVFLLVGSILLLPVPLAFICLSYLLILATI
LRVPSAAGCRKAFSTCSAHLAVVLLFYSTIIFTYMKPKSKEAHISDEVFTVLYAMVTP
ML" (SEQ ID NO:278).
BASE COUNT 79 a 163 c 125 g 119 t
ORIGIN
1 cctgccatct gccagccact caggtaccgc gtgctcatga accaccggct ctgtgtgctg
61 ctggtgggag ctgcctgggt cctctgcctc ctcaagtcgg tgactgagac agtcattgcc
121 atgaggctgc ccttctgtgg ccaccacgtg gtcagtcact tcacctgcga gatcctggcg
181 gtgctgaagc tgacgtgcgg taacacatcg gtcagcgagg tcttcctgct ggtgggctcc
241 atcctgctgc tgcctgtgcc cctggcattc atttgcctgt cctacttgct catcctggcc
301 accatcctga gggtgccctc agctgctggg tgccgcaaag ccttctccac ctgctcagca
361 cacctggctg tggtgctgct tttctacagc accatcatct tcacgtacat gaagcccaag
421 agcaaggaag cccacatctc tgatgaggtc ttcacagtcc tctacgccat ggtcacaccc
481 atgttg (SEQ ID NO:277).

OR172

LOCUS AF179793 489 bp DNA PRI 31-DEC-2000
DEFINITION Macaca sylvanus MSY173 pseudogene, partial sequence.
ACCESSION AF179793
KEYWORDS .
SOURCE Barbary ape.
ORGANISM Macaca sylvanus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Macaca.
REFERENCE 1 (bases 1 to 489)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 489)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR

1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..489
/organism="Macaca sylvanus"
/db_xref="taxon:9546"
gene <1..>489
/gene="MSY173"
/pseudo
BASE COUNT 95 a 120 c 104 g 170 t
ORIGIN
1 cgtggccatc tgtaacccac tgttgtacac ggtcaccatg tctccccaga tgtgtttgct
61 ccttttgctg ggtgtctatg ggatgggggt ttttggggct gtgactcata tgggaaacat
121 aacgtttatg tccttttgtg gagacaacct tgtcaatcac tacatgtgtg acctccttcc
181 tctccttgag ctctcttgca acagcactta cataaatttg ctggtggttt ttattattgt
241 gaccaatggc attggggtgc caattgtcac catttttatc tcttatggtt ttattctttc
301 cagcattctc cacattagct ccacagaggg caggtctaaa gccttcagta cctgcagttc
361 cacataattg tggtatcgct gttctttggg tcaggtgctt tcatgtacct cacaccacct
421 tctagtctac ccctggacca ggggaacgtg tcctccattt tttatactgc tgtaatgccc
481 atgtagatt (SEQ ID NO:279).

OR173

LOCUS AF179794 481 bp DNA PRI 31-DEC-2000
DEFINITION Macaca sylvanus olfactory receptor (MSY174) gene, partial cds.
ACCESSION AF179794
KEYWORDS .
SOURCE Barbary ape.
ORGANISM Macaca sylvanus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Macaca.
REFERENCE 1 (bases 1 to 481)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 481)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..481
/organism="Macaca sylvanus"
/db_xref="taxon:9546"
gene <1..>481
/gene="MSY174"
CDS <1..>481
/gene="MSY174"
/codon_start=2
/product="olfactory receptor"
/translation="VAICKPLHYATIMSQPMCGFLMGVAGILGFVHGGIQTLFIAHLP
FCGPNVIDHFMCDLVPLLELACTDTHTLGPLIAANSGSLCFLIFSMLVASYVIILCSL
RTHISEGRHKVLSSCTSHIFVVILFFVPCSYLYLRPLTSFFPTDKAVTVFCTLFTPML" (SEQ ID
NO:281).

BASE COUNT 92 a 126 c 97 g 166 t
ORIGIN
1 tgtggccatc tgtaagccct tgcactatgc aaccatcatg agtcaaccta tgtgtggatt
61 cctgatgggg gtggctggga ttctgggatt tgtgcatgga gggatccaga ctttgttcat
121 agcccactta ccattctgtg gccctaatgt catcgaccac tttatgtgtg atttagtacc
181 tcttctagag ctggcctgca cagacactca caccttgggg cctctgatag ctgccaacag
241 tggatcattg tgtttcctca ttttttccat gctggttgct tcctatgtca tcatcctgtg
301 ctccctaagg actcatatct ctgaagggcg tcacaaagtt ctgtctagtt gtacctctca
361 tatctttgtt gtcatcttat tctttgtccc ttgttcatac ctgtatctaa gacctctaac
421 ctccttcttc cccactgaca aagctgtgac tgtgttttgc accctattta cacctatgtt
481 g (SEQ ID NO:280).

OR174

LOCUS AF179795 402 bp DNA PRI 31-DEC-2000
DEFINITION Macaca sylvanus MSY175 pseudogene, partial sequence.
ACCESSION AF179795
KEYWORDS .
SOURCE Barbary ape.
ORGANISM Macaca sylvanus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Macaca.
REFERENCE 1 (bases 1 to 402)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 402)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..402
/organism="Macaca sylvanus"
/db_xref="taxon:9546"
gene <1..>402
/gene="MSY175"
/pseudo
BASE COUNT 89 a 105 c 77 g 131 t
ORIGIN
1 tgtggccatc tgtaagcccc tgcattacac caccatcatg agcagcaaaa tctgcatgca
61 gcttgtgctt gggtgttggc ttgctggttt ctcgtcacct ttccaccact cctcttaggc
121 ctaaatcttg acttctgtgc ctgcctccaa cgtcattaat catttctact gtgacactac
181 tccactcctg cagatttcct gcactgacac acagctcctg gacaggatgg gattcatttc
241 agcattggtg acactcttag tcacattggt aatggtgatg gtatcatgat atccctttct
301 tatggcagtt gcatcttcat gtatgttaag ccatcggtca aacaaaagat atatttttca
361 aagggaattt tggtgctcaa cacctctgtc gttccacttt tg (SEQ ID NO:282).

OR175

LOCUS AF179796 487 bp DNA PRI 31-DEC-2000
DEFINITION Macaca sylvanus olfactory receptor (MSY176) gene, partial cds.
ACCESSION AF179796

KEYWORDS .
SOURCE Barbary ape.
ORGANISM Macaca sylvanus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Macaca.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Macaca sylvanus"
/db_xref="taxon:9546"
gene <1..>487
/gene="MSY176"
CDS <1..>487
/gene="MSY176"
/codon_start=2
/product="olfactory receptor"
/translation="VAICNPLLYALVVSPKVCRLLVSLTYLQSLITALTVSSCVFSVS
YCSSNIINHFYCDDVPLLALSCSDTYIPETAVFIFSGTNLFFSMTVVLISYFNIVITI
LRIRSSEGRQKAFSTCASHMIAVVVFYGTLLFMYLQPRSNHSLDTDKMASVFYTLIIP
ML" (SEQ ID NO:284).
BASE COUNT 104 a 123 c 87 g 173 t
ORIGIN
1 cgtggctatt tgcaaccctc tgctctacgc attagtggtg tctccaaagg tatgtcgtct
61 gctggtgtcc ctcacatacc ttcagagtct tatcacagcc cttactgtct cttcctgtgt
121 gttctctgtg tcatactgtt cttccaacat catcaaccat ttttactgtg acgatgtccc
181 tttgctagca ttgtcgtgtt ctgataccta cattccagaa acagcagtgt ttatcttttc
241 agggaccaat ttgtttttct ccatgaccgt tgttctgata tcctacttca acattgttat
301 taccattttg aggatacgtt cctcagaagg acgacaaaaa gccttttcca cgtgtgcttc
361 tcacatgata gctgtggttg tgttctatgg gactctcctt ttcatgtatt tgcaaccaag
421 gagtaatcac tcattagata ctgacaaaat ggcctcggtc ttctacaccc tgatcatacc
481 tatgttg (SEQ ID NO:283).

OR176

LOCUS AF179797 487 bp DNA PRI 31-DEC-2000
DEFINITION Macaca sylvanus olfactory receptor (MSY177) gene, partial cds.
ACCESSION AF179797
KEYWORDS .
SOURCE Barbary ape.
ORGANISM Macaca sylvanus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Macaca.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Macaca sylvanus"
/db_xref="taxon:9546"
gene <1..>487
/gene="MSY177"
CDS <1..>487
/gene="MSY177"
/codon_start=2
/product="olfactory receptor"
/translation="VAICHPLHYAIIMGQSQCVTLVAGSWVIACACALLHTLLLAWLS
FCADHIIPHFFCDLGALLKLSCSDTSLNQLAIFTAGLTAIMLPFLCILVSYGHTAVTI
LQIPSTNGICKALSTCGSHLSAVTLYYGTIIGLYFLPPSSNTNDKNIIASVIYTVVTP
ML" (SEQ ID NO:286).
BASE COUNT 94 a 146 c 91 g 156 t
ORIGIN
1 tgtggccatc tgtcaccctc tacattatgc catcatcatg ggtcagagtc agtgtgtcac
61 gctggtggct gggtcctggg tcatcgcttg tgcgtgtgct cttttgcaca ctctcctcct
121 ggcctggctt tccttctgtg ctgatcacat catccctcac ttcttctgtg accttggtgc
181 cctgctcaag ttgtcctgct cagacacctc cctcaatcag ttagcaatct ttacagcagg
241 attgacagcc attatgcttc cattcctgtg tatcctggtt tcttatggtc acactgcagt
301 caccatcctc cagattccct ctactaatgg catatgcaaa gccttgtcca cttgtggatc
361 ccacctctca gcagtgactc tctattatgg gaccattatt ggtctctatt ttcttccccc
421 atccagcaac actaatgaca agaacataat tgcttcagtg atatacacag tagtcactcc
481 catgttg (SEQ ID NO:285).

OR177

LOCUS AF179798 487 bp DNA PRI 31-DEC-2000
DEFINITION Macaca sylvanus olfactory receptor (MSY178) gene, partial cds.
ACCESSION AF179798
KEYWORDS .
SOURCE Barbary ape.
ORGANISM Macaca sylvanus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Macaca.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers
source 1..487
/organism="Macaca sylvanus"
/db_xref="taxon:9546"
gene <1..>487
/gene="MSY178"
CDS <1..>487
/gene="MSY178"
/codon_start=2
/product="olfactory receptor"
/translation="VAICFPLHYTAIMSPMLCLALVALSWVLTTFHAMLHTLLMARLC
FCADNVIPHFFCDMSALLKLACSDTQVNELAIFITGGLILVIPFLLILGSYARIVSSI
LKVPSSKGICKAFSTCGSHLSVVSLFYGTVIGLYFCPSANSSTLKETVMAMMYTVVTP
ML" (SEQ ID NO:288).
BASE COUNT 83 a 144 c 105 g 155 t
ORIGIN
1 tgtggccatc tgcttccccc tgcactacac cgccatcatg agccccatgc tctgtctcgc
61 cctggtggcg ctgtcctggg tactgaccac cttccatgcc atgttacaca ctttactcat
121 ggccaggttg tgtttttgtg cagacaatgt gatcccccac ttttctgtg atatgtctgc
181 tctgctgaag ctggcctgct ctgacactca agttaatgaa ttggcgatat ttatcacggg
241 agggctgatt cttgtcatcc cattcctact catccttggg tcctatgcac ggattgtctc
301 ctccatcctc aaggtccctt cgtctaaggg tatctgcaag gccttctcta cttgtggctc
361 ccacctctct gtggtgtcac tgttctatgg gaccgttatt ggtctctact tctgcccatc
421 agctaatagt tctactctaa aggagactgt catggctatg atgtacactg tggtgacccc
481 catgctg (SEQ ID NO:287).

OR178

LOCUS AF179799 484 bp DNA PRI 31-DEC-2000
DEFINITION Macaca sylvanus olfactory receptor (MSY179) gene, partial cds.
ACCESSION AF179799
KEYWORDS .
SOURCE Barbary ape.
ORGANISM Macaca sylvanus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Macaca.
REFERENCE 1 (bases 1 to 484)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 484)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..484
/organism="Macaca sylvanus"
/db_xref="taxon:9546"
gene <1..>484
/gene="MSY179"
CDS <1..>484
/gene="MSY179"

/codon_start=2
/product="olfactory receptor"
/translation="CAICCPLHYTTAMSPKLCILLLSLCWVLSVLYGLIHTFLMTTVT
FCGSRKIHYIFCEMYVLLRLACSDTQINHTVLIATGCFIFLIPFGFMIISYVLIVRAI
LRIPSVSKKYKAFSTCASHLGVVSLFYGTLCMVYLKPLHTYSVKDSVATVMYAVVTPM
M" (SEQ ID NO:290).

BASE COUNT 102 a 139 c 93 g 150 t

ORIGIN

1 atgtgccatc tgctgccccc tccactacac cacagccatg agccctaagc tctgtatctt
61 actcctttcc ttgtgttggg tcttatctgt gctctatggc ctcatacaca ccttcctcat
121 gaccacggtg accttctgtg ggtcacgaaa aatccactac atcttctgtg agatgtatgt
181 attgctgagg ctggcatgtt ccgacactca gattaatcac acagtgctga ttgccacagg
241 ctgctttatc ttcctcattc cctttggatt catgatcatt tcctatgtgt tgattgtcag
301 agccatcctc agaataccct cagtctctaa gaaatacaaa gccttctcca cttgtgcctc
361 ccatttgggt gtagtctccc tcttctatgg gacactttgt atggtatacc tgaagccccc
421 ccatacctac tctgtgaagg actcagtagc cacagtgatg tatgcggtgg tgacacccat
481 gatg (SEQ ID NO:289).

OR179

LOCUS AF179800 487 bp DNA PRI 31-DEC-2000
DEFINITION Macaca sylvanus MSY180 pseudogene, partial sequence.
ACCESSION AF179800
KEYWORDS .
SOURCE Barbary ape.
ORGANISM Macaca sylvanus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Macaca.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Macaca sylvanus"
/db_xref="taxon:9546"
gene <1..>487
/gene="MSY180"
/pseudo

BASE COUNT 92 a 143 c 100 g 152 t

ORIGIN

1 tgctgccata tgtcaccctc tccattacac tgccatcatg agggaagagc tctgtgtctt
61 cttagtggct gtatcttgaa ttctgtcttg tgccagctcc ctctctcaca cccttctcct
121 gacccagctg tctttctgtg ctgcgaacac catcccccac atcttctgtg accttgctgc
181 cctgctcaag ctgtcctggt cagatatctt cctcaatgag ctggtcatgt tcacagtagg
241 ggtggtggtc attaccctgc cattcatgtg tatcctggta tcatatggct acactggggc
301 caccatcctg agggtcccct caaccaaagg gatccacaaa gcattgtcca catgtgcctc
361 ccatctctct gtggtttctc tctattatgg gtcaatattt ggccagtaac atttcccaac

421 tgtaagcagt tctattgaca aggatgttac tgtggctctc atgtacatcg tggtcacacc
481 cgtgttg (SEQ ID NO:291).

OR180

LOCUS AF179801 487 bp DNA PRI 31-DEC-2000
DEFINITION Macaca sylvanus MSY181 pseudogene, partial sequence.
ACCESSION AF179801
KEYWORDS .
SOURCE Barbary ape.
ORGANISM Macaca sylvanus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Macaca.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Macaca sylvanus"
/db_xref="taxon:9546"
gene <1..>487
/gene="MSY181"
/pseudo
BASE COUNT 92 a 144 c 100 g 151 t
ORIGIN
1 tgctgccata tgtcaccctc tccattacac tgccatcatg agggaagagc tctgtgtctt
61 cttagtggct gtatcttgaa ttctgtcttg tgccagctcc ctctctcaca cccttctcct
121 gacccagctg tctttctgtg ctgcgaacac catcccccac atcttctgtg accttgctgc
181 cctgctcaag ctgtcctggt cagatatctc cctcaatgag ctggtcatgt tcacagtagg
241 ggtggtggtc attaccctgc cattcatgtg tatcctggta tcatatggct acactggggc
301 caccatcctg agggtcccct caaccaaagg gatccacaaa gcattgtcca catgtgcctc
361 ccatctctct gtggtttctc tctattatgg gtcaatattt ggccagtaac atttcccaac
421 tgtaagcagt tctattgaca aggatgttac tgtggctctc atgtacatcg tggtcacacc
481 cgtgttg (SEQ ID NO:292).

OR181

LOCUS AF179802 487 bp DNA PRI 31-DEC-2000
DEFINITION Macaca sylvanus olfactory receptor (MSY182) gene, partial cds.
ACCESSION AF179802
KEYWORDS .
SOURCE Barbary ape.
ORGANISM Macaca sylvanus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Macaca.
REFERENCE 1 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Macaca sylvanus"
/db_xref="taxon:9546"
gene <1..>487
/gene="MSY182"
CDS <1..>487
/gene="MSY182"
/codon_start=2
/product="olfactory receptor"
/translation="VAICKPLHYMVIMNNRVCTLLVLCSWVAGLMIIVPPLSLGLQLE
FCGSNAIDHFSCDAGPLLKISCSDTWVIEQIVILMAVFALIITLVCVILSYLYIVRTI
LRFPSVQQRKKAFSTCSSHMIVVSIAYGSCIFVYIKPSAKDEVAINKGVSVLTTSVAP
LL" (SEQ ID NO:294).
BASE COUNT 115 a 113 c 98 g 161 t
ORIGIN
1 tgtggccatc tgtaaacccc ttcattatat ggtcatcatg aacaacaggg tgtgtacctt
61 attagtcctc tgcagttggg tggctggctt gatgatcatt gttccaccac tgagcttagg
121 cctccagctc gaattctgtg gctccaatgc cattgatcat tttagctgtg atgcaggtcc
181 tctcctaaag atctcatgct cagacacatg ggtaatagaa cagatagtta tacttatggc
241 tgtatttgca ctcattatca ccctagtttg tgtgattctg tcctacttgt acatagtcag
301 aacaattctg aggttccctt ctgttcagca aaggaaaaag gccttttcta cctgttcatc
361 ccacatgatt gtggtttcca ttgcctatgg aagctgcatc ttcgtctata tcaagccctc
421 tgcaaaagat gaagtggcca taaataaagg agtttcagtt cttactactt ctgttgcacc
481 cttgttg (SEQ ID NO:293).

OR182

LOCUS AF179803 487 bp DNA PRI 31-DEC-2000
DEFINITION Callithrix jacchus olfactory receptor (CJA169) gene, partial cds.
ACCESSION AF179803
KEYWORDS .
SOURCE Callithrix jacchus.
ORGANISM Callithrix jacchus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Callitrichidae; Callithrix.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers
source 1..487
/organism="Callithrix jacchus"
/db_xref="taxon:9483"
gene <1..>487
/gene="CJA169"
CDS <1..>487
/gene="CJA169"
/codon_start=2
/product="olfactory receptor"
/translation="VAICRPLYYSTVMSPQVCALILALCWVLTNVVALTHTLLMARLS
FCVTGEIAHFFCDITPVLKLSCSDTHINEMMVFVLGGTVLIVPFICIVTSYIHIVPAI
LRVRTCGGAGKAFSTCSSHLCIVCIFYGTLFSAYLCPPSIASEEKDIAAAALYTIVTP
ML" (SEQ ID NO:296).
BASE COUNT 89 a 147 c 103 g 148 t
ORIGIN
1 tgtggccatt tgccgccccc tgtactactc cacagtcatg agcccccaag tctgtgccct
61 aatccttgca ttgtgctggg tcctcaccaa tgttgttgcc ctgactcaca cactcctcat
121 ggctcgactg tccttctgtg tgactgggga aatagctcac tttttctgtg acatcactcc
181 tgtcctgaag ctatcatgtt ctgacaccca catcaacgag atgatggttt ttgtcttggg
241 aggcacagta ctcattgtcc cctttatatg cattgtcacc tcctacatcc acattgtgcc
301 tgctatcctg agggtccgaa cctgtggtgg ggcgggcaag gccttttcca cctgcagttc
361 ccacctctgc attgtttgta tattctatgg gaccctcttc agtgcctacc tgtgtcctcc
421 ctctattgcc tctgaagaga aggacattgc agcagctgca ctgtatacca tagtgactcc
481 catgttg (SEQ ID NO:295).

OR183

LOCUS AF179804 486 bp DNA PRI 31-DEC-2000
DEFINITION Callithrix jacchus olfactory receptor (CJA170) gene, partial cds.
ACCESSION AF179804
KEYWORDS .
SOURCE Callithrix jacchus.
ORGANISM Callithrix jacchus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Callitrichidae; Callithrix.
REFERENCE 1 (bases 1 to 486)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 486)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..486
/organism="Callithrix jacchus"
/db_xref="taxon:9483"
gene <1..>486
/gene="CJA170"
CDS <1..>486
/gene="CJA170"
/codon_start=1

/product="olfactory receptor"
/translation="VAICHPLHYTVTINPRLCGLLVLASWILSALNSSLQTLIVLRLS
FCTDLEIPRFFCELNQVIHLACSDTFLNDVVMYLAAVLLGGGPLAGILYSYSKIVSSI
RAISSAQGKYKAFSTCVSHILIVSLFYGTLLGVYLSSAATGNSHSRAAASVMYTVVTP
ML" (SEQ ID NO:298).
BASE COUNT 96 a 135 c 102 g 153 t
ORIGIN
1 gtggccatct gtcacccact gcactacaca gtcaccatta accccagact gtgtggactg
61 ctggttctgg catcctggat cctgagtgcc ctgaattcct cattacaaac cttaatagtg
121 ctgcggcttt ccttctgcac agacttggaa atccccccgct ttttctgcga acttaatcag
181 gtcatccacc ttgcctgttc tgacactttt cttaatgatg tggtgatgta tttggccgct
241 gtgctgctgg ggggtggtcc ccttgcaggg attctttact cttactctaa gatagtttcc
301 tccatacgtg caatctcatc agctcagggg aagtacaagg cattttccac ctgtgtatct
361 cacatcttaa ttgtctcctt attttatggt acactcctag gtgtgtacct tagttctgct
421 gcaactggca actcacattc aagagctgca gcctcggtga tgtacactgt ggtcaccccc
481 atgctg (SEQ ID NO:297).

OR184

LOCUS AF179805 487 bp DNA PRI 31-DEC-2000
DEFINITION Callithrix jacchus olfactory receptor (CJA171) gene, partial cds.
ACCESSION AF179805
KEYWORDS .
SOURCE Callithrix jacchus.
ORGANISM Callithrix jacchus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Callitrichidae; Callithrix.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Callithrix jacchus"
/db_xref="taxon:9483"
gene <1..>487
/gene="CJA171"
CDS <1..>487
/gene="CJA171"
/codon_start=2
/product="olfactory receptor"
/translation="VAICNPLLYMVTMSPQVCLLLLLGVYGMGALGAVAHMGNIMFMT
FCAETLVNHYMCDILPLLELSCNSSYINLLLVFIIVTIGIGVPIVTIFISYGFILSSI
LHISSAEGRSKAFSTCSSHIVVVLLFFGSGAFMYLKPPSILPLDQGKVSSIFYTAVVP
MF" (SEQ ID NO:300).
BASE COUNT 88 a 118 c 107 g 174 t
ORIGIN
1 cgtggccatc tgtaacccac tgttgtacat ggtcaccatg tctccccagg tgtgcttgct
61 ccttttgttg ggtgtctatg ggatgggggc tttgggggct gtggctcata tgggaaacat

121 aatgtttatg acctttgtg cagaaaccct tgtcaatcac tacatgtgtg acatccttcc
181 cctccttgag ctctcctgca acagctctta cataaatttg ctgttggttt ttattattgt
241 gaccattggc attggggtgc ccattgtcac catttttatc tcttatggtt ttattctttc
301 cagcattctc cacattagtt ctgctgaggg caggtctaaa gccttcagta cctgcagctc
361 ccacatagtt gtggtattgc ttttctttgg gtcaggagct tttatgtacc tcaaaccacc
421 ttctattcta cccctggacc aggggaaagt gtcctccatt ttttatactg cggtggtgcc
481 catgttt (SEQ ID NO:299).

OR185

LOCUS AF179806 487 bp DNA PRI 31-DEC-2000
DEFINITION Callithrix jacchus olfactory receptor (CJA196) gene, partial cds.
ACCESSION AF179806
KEYWORDS .
SOURCE Callithrix jacchus.
ORGANISM Callithrix jacchus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Callitrichidae; Callithrix.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Callithrix jacchus"
/db_xref="taxon:9483"
gene <1..>487
/gene="CJA196"
CDS <1..>487
/gene="CJA196"
/codon_start=2
/product="olfactory receptor"
/translation="LAICHPLHYSSKMSLCSCTLMLGCLWTTASLHALLHTLLLARLD
FCASNVIPYFFCDLVPLLQLSCSDTRLNQLMIVLVGGLIILLPFLGILGSYTCIAAAV
LRVPSARGTWKAFSTCGSHLTMVILFYGTISGVYLRPSSSHSTDKDSLASVMYMVVTP
ML" (SEQ ID NO:302).
BASE COUNT 78 a 176 c 105 g 128 t
ORIGIN
1 cttggccatc tgccacccgc tgcactactc ctccaagatg agcctgtgca gctgcaccct
61 aatgttgggc tgcttatgga ccactgccag cctccatgcc cttctgcaca cccttctctt
121 ggcccggctg gacttctgtg ccagcaatgt tatcccctac ttcttctgtg acctcgttcc
181 cctgctccag ctctcctgtt ctgacacccg actcaaccag ctcatgattg tgctggtggg
241 gggcctgatc atcctcctgc ccttccttgg cattctcggt tcctacacat gcattgcagc
301 tgcagtgctc agagtcccct ctgccagggg tacgtggaag gccttttcca cctgtggctc
361 ccacctgacc atggtcatcc tcttctatgg caccatctca ggggtctacc tgaggccctc
421 atcctcccac tccacagaca aggactcact agcctcagtg atgtacatgg tagtgacccc
481 catgctg (SEQ ID NO:301).

OR186

LOCUS AF179807 487 bp DNA PRI 31-DEC-2000
DEFINITION Callithrix jacchus olfactory receptor (CJA197) gene, partial cds.
ACCESSION AF179807
KEYWORDS .
SOURCE Callithrix jacchus.
ORGANISM Callithrix jacchus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Callitrichidae; Callithrix.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Callithrix jacchus"
/db_xref="taxon:9483"
gene <1..>487
/gene="CJA197"
CDS <1..>487
/gene="CJA197"
/codon_start=2
/product="olfactory receptor"
/translation="VAICHPLHYTVTINPRLCGLLVLASWILSALNSSLQTLIVLRLS
FCTDLEIPHFFCELNQVIHLACSDTFLNDVVMYLAAVLLGGGPLAGILYSYSKIVSSI
RAISSAQGKYKAFSTCVSHILIVSLFYGTLLGVYLSSAATGNSHSRAAASVMYTVVTP
ML" (SEQ ID NO:304).
BASE COUNT 98 a 134 c 100 g 155 t
ORIGIN
1 tgttgccata tgtcacccac tgcactacac agtcaccatt aaccccagac tgtgtggact
61 gctggttctg gcatcctgga tcctgagtgc cctgaattcc tcattacaaa ccttaatagt
121 gctgcggctt tccttctgca cagacttgga aatccccccac tttttctgcg aacttaatca
181 ggtcatccac cttgcctgtt ctgacacttt tcttaatgat gtggtgatgt atttggccgc
241 tgtgctgctg gggggtggtc cccttgcagg gattctttac tcttactcta agatagtttc
301 ctccatacgt gcaatctcat cagctcaggg gaagtacaag gcatttttcca cctgtgtatc
361 tcacatctta attgtctcct tattttatgg tacactccta ggtgtgtacc ttagttctgc
421 tgcaactggc aactcacatt caagagctgc agcctcggtg atgtacactg tggtcacccc
481 catgctg (SEQ ID NO:303).

OR187

LOCUS AF179808 487 bp DNA PRI 31-DEC-2000
DEFINITION Callithrix jacchus olfactory receptor (CJA198) gene, partial cds.
ACCESSION AF179808
KEYWORDS .
SOURCE Callithrix jacchus.
ORGANISM Callithrix jacchus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Callitrichidae; Callithrix.

REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Callithrix jacchus"
/db_xref="taxon:9483"
gene <1..>487
/gene="CJA198"
CDS <1..>487
/gene="CJA198"
/codon_start=2
/product="olfactory receptor"
/translation="IAICSPLLYNVIMSYHFCFRLTVGVYILGILGSTIHTSSMLRLF
LCKTNVINHYFCDLFPLLELSCSSTYINELLVLVLSALNILTPALTILASYIFTIASI
LHIRSTEGRSKAFSTCSSHISAVAVFFGSAAFMYLQPSSVSSMDQGKVSSVFYTTVVP
ML" (SEQ ID NO:306).
BASE COUNT 101 a 138 c 87 g 161 t
ORIGIN
1 cattgccatc tgtagcccct tgctgtacaa tgtcatcatg tcctatcact tctgcttccg
61 gctcacagtg ggagtttaca ttttaggcat ccttggatct acaattcaca ccagctctat
121 gttgagactc tttctgtgca aaactaatgt gattaaccat tatttttgtg atctcttccc
181 tctcttggaa ctctcctgct ccagtaccta catcaatgaa ttactagttc tggtcttgag
241 tgcattgaat atcctgacgc ctgccttaac tatcctggcc tcttatatct tcaccattgc
301 cagtatcctc cacattcgct ccactgaggg caggtccaaa gccttcagca cttgcagctc
361 ccacatctca gctgttgctg tcttctttgg atctgcagca ttcatgtacc tgcagccatc
421 atctgtcagt tccatggacc aggggaaagt gtcatctgtg ttttacacaa ctgttgtgcc
481 catgctg (SEQ ID NO:305).

OR188

LOCUS AF179809 469 bp DNA PRI 31-DEC-2000
DEFINITION Callithrix jacchus olfactory receptor (CJA199) gene, partial cds.
ACCESSION AF179809
KEYWORDS .
SOURCE Callithrix jacchus.
ORGANISM Callithrix jacchus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Callitrichidae; Callithrix.
REFERENCE 1 (bases 1 to 469)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 469)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR

1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..469
/organism="Callithrix jacchus"
/db_xref="taxon:9483"
gene <1..>469
/gene="CJA199"
CDS <1..>469
/gene="CJA199"
/codon_start=2
/product="olfactory receptor"
/translation="VAICHPLHYTTVMSRGLCCVLVAASWMGGFVHSTVQTILTIRLP
FCGPNQVDNFFCDVPPVIKLACADTFVIELLMVSNSGLISTSSFVVLISSYTTILVKI
HSKEGRRKALSTCASHLMVVTLFGPCSFIYPHPFSTFSVDKMVSVLYKVITPML" (SEQ ID
NO:308).
BASE COUNT 91 a 126 c 97 g 155 t
ORIGIN
1 tgttgctatc tgtcaccccc tgcactacac cactgtcatg agtcggggat tatgctgtgt
61 gttggttgct gcctcctgga tgggaggatt tgtgcactcc accgtccaga ccattctcac
121 tatccgtctg ccctttgtg ggccaaatca ggtggacaac ttttttgtg atgttccccc
181 tgtcatcaaa cttgcctgtg ctgacacttt tgtcattgaa ttgctcatgg tatctaacag
241 tgggttgatc tccaccagct cctttgtggt gctgatttcc tcctacacca ctatcctagt
301 caagattcac tccaaggagg gaaggcgaaa ggcactctcc acatgtgcct ctcaccttat
361 ggtggtaaca ctttttggac cctgtagttt catctatcct catcctttct ctacattttc
421 tgtggacaag atggtgtctg tactctacaa ggttattact ccaatgcta (SEQ ID NO:307).

OR189

LOCUS AF179810 488 bp DNA PRI 31-DEC-2000
DEFINITION Callithrix jacchus olfactory receptor (CJA201) gene, partial cds.
ACCESSION AF179810
KEYWORDS .
SOURCE Callithrix jacchus.
ORGANISM Callithrix jacchus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Callitrichidae; Callithrix.
REFERENCE 1 (bases 1 to 488)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 488)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..488
/organism="Callithrix jacchus"
/db_xref="taxon:9483"
gene <1..>488
/gene="CJA201"
CDS <1..>488
/gene="CJA201"
/codon_start=2

/product="olfactory receptor"
/translation="VAICFPLRYMLLMSHSICVTMIIVCWSISIAGALILTVFTMHLP
YCGPYKINHFFCEVPAVLKLACADTSFNDRLDFILGFILLLVPLSLILASYVFIFASI
FRIRSAQGRLKSFSTCASHVTVVTMFYGPAIIMYMRPGSWYDPERDKKLALFYNVVSG
FL" (SEQ ID NO:310).

BASE COUNT 84 a 145 c 105 g 154 t

ORIGIN

1 cgttgccatt tgcttccccc ttcgctatat gctactcatg agccattcca tttgtgtcac
61 gatgattata gtttgttggt ccattagcat agctggggcc ctgatcctca ctgtcttcac
121 catgcatctg ccttattgtg gcccctacaa gataaaccac ttcttctgtg aggtccctgc
181 tgtcctgaag ttggcctgtg cagacacatc ttttaatgac aggctggact tcatcttggg
241 tttcatcctg cttttggtcc cactctccct catcctggcc tcttacgtct tcatctttgc
301 ctctatcttc agaatccgct cagcgcaggg gaggctcaag tccttctcca cgtgtgcttc
361 ccacgtcact gtggtcacca tgttctatgg gccggccatc atcatgtaca tgaggcccgg
421 ttcttggtat gacccagagc gggacaagaa gctagcgctg ttctacaatg tggtctctgg
481 cttcctca (SEQ ID NO:309).

OR190

LOCUS AF179811 487 bp DNA PRI 31-DEC-2000

DEFINITION Callithrix jacchus olfactory receptor (CJA202) gene, partial cds.

ACCESSION AF179811

KEYWORDS .

SOURCE Callithrix jacchus.

ORGANISM Callithrix jacchus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Callitrichidae; Callithrix.

REFERENCE 1 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..487
/organism="Callithrix jacchus"
/db_xref="taxon:9483"

gene <1..>487
/gene="CJA202"

CDS <1..>487
/gene="CJA202"
/codon_start=2
/product="olfactory receptor"
/translation="VAICHPLRYTATMNLRLCVQLVAGLWLVTYLHALLHTSLIAHLS
FCAFNIIHHFFCDLNPLLRLSCSAVSFNVMIIFAVGGLLALTPLVCILVFYGLIFSTV
LKITSTQGKQRAASTCGCHLSVVVLFYGTAIAVYFSPSSSHTPESDTLSTVMYSVVAP
ML" (SEQ ID NO:312).

BASE COUNT 86 a 152 c 94 g 155 t

ORIGIN

1 tgtggcaatt tgccaccccc tacgttacac tgccacaatg aacctgcgcc tttgtgtcca
61 gctagtggct ggactgtggc ttgttactta cctccatgcc ctcctgcata cttccctaat

121 agcacatctg tccttctgtg ccttcaatat catccatcat ttcttctgtg atctcaaccc
181 tctactacgg ctctcttgct ctgccgtctc cttcaacgta atgatcattt ttgcagtagg
241 aggtctattg gctctcacgc cccttgtctg tatcctcgta ttttatggac ttatcttctc
301 cactgttctg aagatcacct ctactcaggg gaaacagaga gctgcttcca cctgcggctg
361 ccacctgtca gtagtggtgc tgtttttatgg cacagccatt gccgtctact ttagcccctc
421 atcctcccat acgcctgaga gtgacactct ctcgaccgtc atgtattcag tggtggcccc
481 gatgctg (SEQ ID NO:311).

OR191

LOCUS AF179812 491 bp DNA PRI 31-DEC-2000
DEFINITION Pongo pygmaeus PPY110 pseudogene, partial sequence.
ACCESSION AF179812
KEYWORDS .
SOURCE orangutan.
ORGANISM Pongo pygmaeus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pongo.
REFERENCE 1 (bases 1 to 491)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 491)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..491
/organism="Pongo pygmaeus"
/db_xref="taxon:9600"
gene <1..>491
/gene="PPY110"
/pseudo
BASE COUNT 92 a 118 c 105 g 176 t
ORIGIN
1 cgtggccatc tgtaacccac tgttgtaaac ggtcaccatg tctccccaga tgtgtttgct
61 cctttcactg ggtgtctatg ggatgggggt ttttggggct gtggttcata tgggaaacat
121 aatgtttatg tccttttgtg gagacaacct tgtcaatcac tatctgtgtg acatccttcc
181 tctccttgag ctctcctgca acagctctta cataaatttg ctggtggttt ttattattgt
241 gaccattggc attggggtgc caattgtcac catttttatc tcttatggtt ttattctttc
301 cagcattctc cacattagct cacagagggc aggtcaggtc taaagccttc agtacctgca
361 gttcccacat aattgtggta tcgcttttct ttgggtcagg tgctttcatg tacctcaaac
421 caccttctct tctacccctg gaccagggga aagtgtcctc catttttat actgctgtgg
481 tgcccatgtt t (SEQ ID NO:313).

OR192

LOCUS AF179813 480 bp DNA PRI 31-DEC-2000
DEFINITION Pongo pygmaeus PPY111 pseudogene, partial sequence.
ACCESSION AF179813
KEYWORDS .
SOURCE orangutan.
ORGANISM Pongo pygmaeus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pongo.
REFERENCE 1 (bases 1 to 480)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 480)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..480
/organism="Pongo pygmaeus"
/db_xref="taxon:9600"
gene <1..>480
/gene="PPY111"
/pseudo
BASE COUNT 81 a 141 c 100 g 158 t
ORIGIN
1 tgtggccatc tgcttccccc tgcactacac catccatcat gagccccatg ctctgtctct
61 ccctttggc gctgtcctgg gtgctgacca ccttccatgc catgttacac actttactca
121 tggccaggtt gtgtttttgt gcagacaatg tgatccccca ctttttctgt gatatgtctg
181 ctctgctgaa gctgtcctgc tctgacactc gagttaatga attggtgata tttatcatgg
241 gagggctcat tcttgtcatc ccattcctac tcatccttgg gtcctatgca cgaattgtct
301 cctccatcct caaggtccct tctaagggta tctgcaaggc cttctctact tgtggctccc
361 acctctctgt ggtgtccctg ttctatggga ccgttagtgg tctctactta tgcccatcgg
421 ctaatagttc tactctgaag gagactgtca tggctgtaat gtacactgtg gtgaccccca (SEQ ID NO:314).

OR193

LOCUS AF179814 486 bp DNA PRI 31-DEC-2000
DEFINITION Pongo pygmaeus olfactory receptor (PPY112) gene, partial cds.
ACCESSION AF179814
KEYWORDS .
SOURCE orangutan.
ORGANISM Pongo pygmaeus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pongo.
REFERENCE 1 (bases 1 to 486)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 486)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..486
/organism="Pongo pygmaeus"
/db_xref="taxon:9600"
gene <1..>486

/gene="PPY112"
CDS <1..>486
/gene="PPY112"
/codon_start=1
/product="olfactory receptor"
/translation="CAICHPLHYATIMSQSQCVMLVAGSWVIACACALLHTLLLARLS
FCADHIISHFFCDLGALLKLSCSDTSLNQLAIFTAGLTAIMLPFLCILVSYGHIGVTI
LQIPSTKGICKALSTCGSHLSVVTIYYGTIIGLYFLPPSSNTNDKNIIASVIYTVVTP
ML" (SEQ ID NO:316).
BASE COUNT 96 a 147 c 93 g 150 t
ORIGIN
1 tgtgccatct gtcaccctct acattatgcc accatcatga gtcagagcca gtgtgtcatg
61 ctggtggctg ggtcctgggt catcgcttgt gcgtgtgctc ttttgcatac cctccttctg
121 gcccggcttt ccttctgtgc tgaccacatc atctctcact tcttctgtga ccttggtgcc
181 ctgctcaagc tgtcctgctc agacacctcc ctcaatcagt tagcaatctt tacagcagga
241 ttgacagcca ttatgcttcc attcctgtgc atcctggttt cttatggtca cattggggtc
301 accatcctcc agattccctc caccaagggc atatgcaaag ccttgtccac ttgtggatcc
361 cacctctcag tggtgactat ctattatggg acaattattg gtctctattt tctaccccca
421 tccagcaaca ccaatgacaa gaacataatt gcttcagtga tatacacagt agtcactccc
481 atgttg (SEQ ID NO:315).

OR194

LOCUS AF179815 487 bp DNA PRI 31-DEC-2000
DEFINITION Pongo pygmaeus PPY113 pseudogene, partial sequence.
ACCESSION AF179815
KEYWORDS .
SOURCE orangutan.
ORGANISM Pongo pygmaeus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pongo.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Pongo pygmaeus"
/db_xref="taxon:9600"
gene <1..>487
/gene="PPY113"
/pseudo
BASE COUNT 107 a 130 c 95 g 155 t
ORIGIN
1 cactgccatt tgccaccctc taagataaac caatctcatg agacccaaaa tttgtggact
61 tatgactgcc ttctcctgga tcctgggctc tacggatgga atcattgatg ctgcagcgac
121 attttccttc tcctactgtg ggtctcggga aatagcccac ttcttctgtg agttcccttc
181 catactaatc ctctcatgca atgacacatc aatatttgaa aaggttcttt tcatctgctg
241 tatagtaatg attgtttttc ctgttgcaat catcatcgct tcctatgctc aagttattct

301 ggctgtcatt cacatgggat ctggagaggg tcgtcggata gctttcacga cctgttcctc
361 tcacctcatg gtggtgggaa tgtactatgg agcagctttg ttcatgtaca tacggcccac
421 atctgatcgc tcccctacac aggacaagat ggtgtctgta ttctacacca tcctcactcc
481 catgctg (SEQ ID NO:317).

OR195

LOCUS AF179816 484 bp DNA PRI 31-DEC-2000
DEFINITION Pongo pygmaeus olfactory receptor (PPY114) gene, partial cds.
ACCESSION AF179816
KEYWORDS .
SOURCE orangutan.
ORGANISM Pongo pygmaeus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pongo.
REFERENCE 1 (bases 1 to 484)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 484)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..484
/organism="Pongo pygmaeus"
/db_xref="taxon:9600"
gene <1..>484
/gene="PPY114"
CDS <1..>484
/gene="PPY114"
/codon_start=2
/product="olfactory receptor"
/translation="VAICFPLHYTAIMSPMLCLSLVALSWVLTTFHAMLHTLLMARLC
FCADNVIPHFFCDMSALLKLSCSDTRVNELVIFIMGGLILVIPFLLILGSYARIVSSI
LKVPSKGICKAFSTCGSHLSVVSLFYGTVSGLYLCPSANSSTLKETVMAVMYTVVTPM
L" (SEQ ID NO:319).
BASE COUNT 80 a 142 c 105 g 157 t
ORIGIN
1 tgtggccatc tgcttccccc tgcactacac cgccatcatg agccccatgc tctgtctctc
61 cctggtggcg ctgtcctggg tgctgaccac cttccatgcc atgttacaca ctttactcat
121 ggccaggttg tgtttttgtg cagacaatgt gatcccccac tttttctgtg atatgtctgc
181 tctgctgaag ctgtcctgct ctgacactcg agttaatgaa ttggtgatat ttatcatggg
241 agggctcatt cttgtcatcc cattcctact catccttggg tcctatgcac gaattgtctc
301 ctccatcctc aaggtccctt ctaagggtat ctgcaaggcc ttctctactt gtggctccca
361 cctctctgtg gtgtccctgt tctatgggac cgttagtggt ctctacttat gcccatcggc
421 taatagttct actctgaagg agactgtcat ggctgtaatg tacactgtgg tgacccccat
481 gctg (SEQ ID NO:318).

OR196

LOCUS AF179817 483 bp DNA PRI 31-DEC-2000
DEFINITION Pongo pygmaeus olfactory receptor (PPY115) gene, partial cds.
ACCESSION AF179817
KEYWORDS .
SOURCE orangutan.
ORGANISM Pongo pygmaeus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pongo.
REFERENCE 1 (bases 1 to 483)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 483)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..483
/organism="Pongo pygmaeus"
/db_xref="taxon:9600"
gene <1..>483
/gene="PPY115"
CDS <1..>483
/gene="PPY115"
/codon_start=1
/product="olfactory receptor"
/translation="VAVCHPLHYTLIMHGGLCLGLVAGCLVAGFMNSLMETIITFQLL
LCHNVINHFACETLAVLRLACVDVSFNKAMVAISGFLVILLPCSLILFSYAHIVAAIL
HIPSAQGRRKAFGTCTSHLTVVCMCFGATMFTYMRPAGGSSLEKKNMVALFYAIVIPM
L" (SEQ ID NO:321).
BASE COUNT 86 a 136 c 115 g 146 t
ORIGIN
1 gtggccgtct gccacccact gcattacacg ctcatcatgc atggagggct gtgcctgggg
61 ctggtggccg gctgcctggt ggctggtttc atgaattccc tgatggaaac aattatcacc
121 ttccagcttc tcctgtgtca caatgttatt aatcactttg cctgtgagac cttagcagtg
181 ctacgactag cctgtgtgga cgtctccttc aacaaggcca tggtggccat ctcagggttt
241 ctggtgatcc tgcttccctg ttcactgatc ctattctcct atgctcacat agttgctgcc
301 attcttcata ttccttctgc ccagggacgc cgcaaagcct ttgggacttg cacgtctcac
361 ctcactgtgg tttgcatgtg ctttggggct acaatgttca cctacatgag acctgcgggc
421 ggctcctccc tggaaaagaa gaatatggtt gccctctttt atgccattgt gattccaatg
481 ctt (SEQ ID NO:320).

OR197

LOCUS AF179818 484 bp DNA PRI 31-DEC-2000
DEFINITION Pongo pygmaeus olfactory receptor (PPY116) gene, partial cds.
ACCESSION AF179818
KEYWORDS .
SOURCE orangutan.
ORGANISM Pongo pygmaeus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Catarrhini; Hominidae; Pongo.
REFERENCE 1 (bases 1 to 484)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 484)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..484
/organism="Pongo pygmaeus"
/db_xref="taxon:9600"
gene <1..>484
/gene="PPY116"
CDS <1..>484
/gene="PPY116"
/codon_start=2
/product="olfactory receptor"
/translation="VAVCHPLHYTLIMHGGLCLGLVAGCLVAGFMNSLMETIITFQLP
LCHNVINHFACETLAVLRLACVDVSFNKATVAISGFLVILLPCSLILFSYAHIVAAIL
RIPSAQGHRKAFGTCTSHLTVVCMCFGATMFTYMRPAGGSSLEKENMVALFYAIVIPM
L" (SEQ ID NO:323).
BASE COUNT 85 a 138 c 116 g 145 t
ORIGIN
1 tgtggccgtc tgccacccac tgcattacac gctcatcatg catggagggc tgtgcctggg
61 gctggtggcc ggctgcctgg tggctggttt catgaattcc ctgatggaaa caattatcac
121 cttccagctt cccctgtgtc acaatgttat taatcacttt gcctgtgaga ccttagcagt
181 gctacgacta gcctgtgtgg acgtctcctt caacaaggcc acggtggcca tctcagggtt
241 tctggtgatc ctgcttccct gttcactgat cctattctcc tatgctcaca tagttgctgc
301 cattcttcgt attccttctg cccagggaca ccgcaaagcc tttgggacct gcacgtctca
361 cctcactgtg gtttgcatgt gctttggggc tacaatgttc acctacatga gacctgcggg
421 tggctcctcc ctggaaaagg agaatatggt tgccctcttt tatgccattg tgattccaat
481 gctt (SEQ ID NO:322).

OR198

LOCUS AF179819 479 bp DNA PRI 31-DEC-2000
DEFINITION Pongo pygmaeus PPY117 pseudogene, partial sequence.
ACCESSION AF179819
KEYWORDS .
SOURCE orangutan.
ORGANISM Pongo pygmaeus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pongo.
REFERENCE 1 (bases 1 to 479)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 479)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..479
/organism="Pongo pygmaeus"
/db_xref="taxon:9600"
gene <1..>479
/gene="PPY117"
/pseudo
BASE COUNT 100 a 115 c 91 g 173 t
ORIGIN
1 tgtagccata tgcaaaccct tatactatgt ggtcatcatg agccgaagga cacgcactgt
61 cttggtaatg atctcctggg ctgtgggctt ggtgcacaca ttaagccagt tatcatttac
121 tgtgaacctg ccttttttgt ggacctaatg tagtagacag ctttttttgt gatcttcctc
181 gagtgaccaa acttgcctgc ctggactctt acctcattga aatactaatt gtggtcaata
241 gtggagttct ttccctaagc actttctgtc tcttggtcag ctcctacatc attattcttg
301 ttatggtttg gctcaagtct tcggctgcaa tggcgaaggc attttctacg ctggcttccc
361 atattgcagt agtaatatta ttctttggac cttgcatctt catctatgtg tggcccttta
421 ccatctatcc tttggataaa cttcttgcca tattttacac tgttttcacc cccatccta (SEQ ID NO:324).

OR199

LOCUS AF179820 487 bp DNA PRI 31-DEC-2000
DEFINITION Pongo pygmaeus olfactory receptor (PPY118) gene, partial cds.
ACCESSION AF179820
KEYWORDS .
SOURCE orangutan.
ORGANISM Pongo pygmaeus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pongo.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Pongo pygmaeus"
/db_xref="taxon:9600"
gene <1..>487
/gene="PPY118"
CDS <1..>487
/gene="PPY118"
/codon_start=2
/product="olfactory receptor"
/translation="VAICHPLHYATIMSQSQCVMLVAGSWVIACACALLHTLLLARLS
FCADHIISHFFCDLGALLKLSCSDTSLNQLAIFTAGLTAIMLPFLCILVSYGHIGVTI
LQIPSTKGICKALSTCGSHLSVVTIYYGTIIGLYFLPPSSNTNDKNIIASVIYTVVTP
ML" (SEQ ID NO:326).
BASE COUNT 95 a 147 c 94 g 151 t

ORIGIN
1 tgtggccatc tgtcaccctc tacattatgc caccatcatg agtcagagcc agtgtgtcat
61 gctggtggct gggtcctggg tcatcgcttg tgcgtgtgct cttttgcata ccctccttct
121 ggcccggctt tccttctgtg ctgaccacat catctctcac ttcttctgtg accttggtgc
181 cctgctcaag ctgtcctgct cagacacctc cctcaatcag ttagcaatct ttacagcagg
241 attgacagcc attatgcttc cattcctgtg catcctggtt tcttatggtc acattggggt
301 caccatcctc cagattccct ccaccaaggg catatgcaaa gccttgtcca cttgtggatc
361 ccacctctca gtggtgacta tctattatgg gacaattatt ggtctctatt ttcttccccc
421 atccagcaac accaatgaca agaacataat tgcttcagtg atatacacag tagtcactcc
481 catgttg (SEQ ID NO:325).

OR200

LOCUS AF179821 475 bp DNA PRI 31-DEC-2000
DEFINITION Pongo pygmaeus PPY119 pseudogene, partial sequence.
ACCESSION AF179821
KEYWORDS .
SOURCE orangutan.
ORGANISM Pongo pygmaeus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pongo.
REFERENCE 1 (bases 1 to 475)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 475)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..475
/organism="Pongo pygmaeus"
/db_xref="taxon:9600"
gene <1..>475
/gene="PPY119"
/pseudo
BASE COUNT 98 a 119 c 104 g 154 t
ORIGIN
1 gtagccataa gcaaacctct ccactatgca atcatcatga actcatgcac atgtacaggc
61 ccagtggtag gctcttgggt cattggggtt atgcactccc tgagccagtt agctttcact
121 gtaagcttgc ccttctgtgg cccaaacata gtggacagtt attattgcga ccttactttg
181 gtcatcaaac gtgcctgtac agatgcttat atccctgaag tgttgatgct tttggacggt
241 ggtcttatgg gggtgaccat ttttgctttt gctgatctcc tacacggtca ttctgattac
301 tgtgcagcga cattcctcag caggtatggc caaggctcac agcactctga ctgcccacat
361 tgctgtggtg accgtgttct ttgggccctg tatcttcatc tatgcctggc ctttcagcaa
421 cttaccagtg gataacattt tgtctgtatt ctctgtagtt ttcacaccta tatta (SEQ ID NO:327).

OR201

LOCUS AF179822 487 bp DNA PRI 31-DEC-2000
DEFINITION Pongo pygmaeus olfactory receptor (PPY120) gene, partial cds.
ACCESSION AF179822
KEYWORDS .

SOURCE orangutan.
ORGANISM Pongo pygmaeus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pongo.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Pongo pygmaeus"
/db_xref="taxon:9600"
gene <1..>487
/gene="PPY120"
CDS <1..>487
/gene="PPY120"
/codon_start=2
/product="olfactory receptor"
/translation="VAICHPLHYATTMSQSQCVMLVAGSWVIACACALLHTLLLARLS
FCADHIIPHFFCDLGALLKLSCSDTSLNQLAIFTAGLTAIMLPFLCILVSYGHIGVTI
LQIPSTKGICKALSTCGSHLSVVTIYYGTIIGLYFLPPSSNTNDKNIIASVIYTVVTP
ML" (SEQ ID NO:329).
BASE COUNT 95 a 150 c 94 g 148 t
ORIGIN
1 tgtggccatc tgtcaccctc tacattatgc caccaccatg agtcagagcc agtgtgtcat
61 gctggtggct gggtcctggg tcatcgcttg tgcgtgtgct cttttgcata ccctccttct
121 ggcccggctt tccttctgtg ctgaccacat catccctcac ttcttctgcg accttggtgc
181 cctgctcaag ctgtcctgct cagacacctc cctcaatcag ttagcaatct ttacagcagg
241 attgacagcc attatgcttc cattcctgtg catcctggtt tcttatggtc acattggggt
301 caccatcctc cagattccct ccaccaaggg catatgcaaa gccttgtcca cttgtggatc
361 ccacctctca gtggtgacta tctattatgg gacaattatt ggtctctatt ttcttccccc
421 atccagcaac accaatgaca agaacataat tgcttcagtg atatacacag tagtcactcc
481 catgttg (SEQ ID NO:328).

OR202

LOCUS AF179823 487 bp DNA PRI 31-DEC-2000
DEFINITION Saimiri sciureus olfactory receptor (SSC184) gene, partial cds.
ACCESSION AF179823
KEYWORDS .
SOURCE common squirrel monkey.
ORGANISM Saimiri sciureus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Saimiri sciureus"
/db_xref="taxon:9521"
gene <1..>487
/gene="SSC184"
CDS <1..>487
/gene="SSC184"
/codon_start=2
/product="olfactory receptor"
/translation="VAICYPLHYTAIMREGLCAFLVAVSWIPSCASSLSHTLLLTPLP
FCDANTVHHFFCDLAALLKLSCSDIFLNELVMFTVGVVVITLPFMCILVSYGYTGATI
LRVPSTKGIRKALSMCGSRLSVVSLYYGSIFGQYLFPTVSSSIDKDVIVALMYTVVTP
ML" (SEQ ID NO:331).
BASE COUNT 88 a 142 c 106 g 151 t
ORIGIN
1 tgttgccata tgttaccctc tccactacac tgccatcatg agggaagggc tctgtgcctt
61 cttagtggct gtatcttgga ttccatcttg tgctagctcc ctctctcaca cccttctgct
121 gaccccgctg cctttctgtg atgcaaacac cgtccaccac ttcttctgtg accttgctgc
181 cctgctcaag ctgtcctgct cagatatctt cctcaatgag ctggtcatgt tcacagtagg
241 ggtggtggtc attaccctgc cattcatgtg tatcctggta tcatatggct acactggggc
301 cactatcctg agggtcccct caaccaaagg gatccgcaaa gcgttgtcca tgtgtggctc
361 ccgtctctct gtggtgtctc tgtattatgg ctcaatattt ggccagtacc ttttcccaac
421 tgtaagcagt tccattgaca aggatgtcat tgtggctcta atgtacacag tggtcacacc
481 catgctg (SEQ ID NO:330).

OR203

LOCUS AF179824 488 bp DNA PRI 31-DEC-2000
DEFINITION Saimiri sciureus olfactory receptor (SSC185) gene, partial cds.
ACCESSION AF179824
KEYWORDS .
SOURCE common squirrel monkey.
ORGANISM Saimiri sciureus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.
REFERENCE 1 (bases 1 to 488)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 488)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..488
/organism="Saimiri sciureus"
/db_xref="taxon:9521"

gene <1..>488
/gene="SSC185"
CDS <1..>488
/gene="SSC185"
/codon_start=2
/product="olfactory receptor"
/translation="VAICYPLHYTAIMREGLCAFLVAVSWIPSCASSLSHTLLLTPLS
FCDANTVHHYFCDLAALLKLSCSDIFLNELVMFTVGVVVITLPFMCILVSYGYTGATI
LRVPSTKGIRKALSMCGSRLSVVSLYYGSIFGQYLFPTVSSSIDKDVIVALMYTVVTP
ML" (SEQ ID NO:333).

BASE COUNT 89 a 142 c 106 g 151 t
ORIGIN
1 tgttgccata tgttaccctc tccactacac tgccatcatg agggaagggc tctgtgcctt
61 cttagtggct gtatcttgga ttccatcttg tgctagctcc ctctctcaca cccttctgct
121 gaccccgctg tctttctgtg atgcaaacac cgtccaccac tacttctgtg accttgctgc
181 cctgctcaag ctgtcctgct cagatatctt cctcaacgag ctggtcatgt tcacagtagg
241 ggtggtggtc attaccctgc cattcatgtg tatcctggta tcatatggct acactggggc
301 cactatcctg agggtccctt caaccaaagg gatccgcaaa gcgttgtcca tgtgtggctc
361 ccgtctctct gtggtgtctc tgtattatgg ctcaatattt ggccagtacc ttttcccaac
421 tgtaagcagt tccattgaca aggatgtcat tgtggctcta atgtacacag tggtcacacc
481 catgctgt (SEQ ID NO:332).

OR204

LOCUS AF179825 487 bp DNA PRI 31-DEC-2000
DEFINITION Saimiri sciureus olfactory receptor (SSC186) gene, partial cds.
ACCESSION AF179825
KEYWORDS .
SOURCE common squirrel monkey.
ORGANISM Saimiri sciureus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Saimiri sciureus"
/db_xref="taxon:9521"
gene <1..>487
/gene="SSC186"
CDS <1..>487
/gene="SSC186"
/codon_start=2
/product="olfactory receptor"
/translation="VATCHPLRYMVIMNPCLCSLLILLSPLTSVVNALLLSLMVLRLS
FCTDLEIPLFFCELAQVIQLACSDTLINNILIYFAACIFGGVPLSGIIFSYAQIASSI
LRMPSARRKYKAFSTCGSHLSMVLLFYRTGLGVYISSAVTDSPRKTAVASMMYSVGPQ

MV" (SEQ ID NO:335).
BASE COUNT 92 a 126 c 105 g 164 t
ORIGIN
1 tgtggccact tgtcaccccc ttagatacat ggtcatcatg aacccctgcc tctgcagcct
61 gctgattctt ctttctccgt tgactagcgt tgtgaatgcc cttcttctca gcctgatggt
121 gttgaggctg tccttctgca cagatctgga aatcccgctc ttcttctgtg aactggctca
181 ggtcatccag cttgcttgtt ctgacaccct catcaataac atcctgatat attttgcagc
241 ttgcatattt ggtggtgttc ctctgtctgg aatcatattc tcttatgctc agattgcctc
301 ctctattttg agaatgccat cagcacgcag aaagtataaa gccttttcca cctgtgggtc
361 tcacctctcc atggtgctct tgttctatag gacaggtttg ggggtgtaca ttagttctgc
421 agttactgac tcacctagga agactgcagt ggcttcaatg atgtattctg tgggtcctca
481 aatggtg (SEQ ID NO:334).

OR205

LOCUS AF179826 487 bp DNA PRI 31-DEC-2000
DEFINITION Saimiri sciureus olfactory receptor (SSC187) gene, partial cds.
ACCESSION AF179826
KEYWORDS .
SOURCE common squirrel monkey.
ORGANISM Saimiri sciureus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
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gene <1..>487
/gene="SSC187"
CDS <1..>487
/gene="SSC187"
/codon_start=2
/product="olfactory receptor"
/translation="VAICLPLHYATIMSPMLSRSLVALSWVLTTFHAMLHTLLMARLR
FCADNVILHFFCDMSALLKLACSDTRVNELVIFIMGGLILVIPFLLIIGSYARIVFSI
LKVPSSKGICKAVSTCGSHLSVVSLFYGTVIGLYLCPSANNSTLKETVMAVMYTVMAP
ML" (SEQ ID NO:337).
BASE COUNT 84 a 140 c 104 g 159 t
ORIGIN
1 cgtggccatc tgcctccccc tacattacgc caccatcatg agccccatgc tgtctcgctc
61 cctggtggcg ctgtcctggg tgctgaccac cttccatgcc atgttgcaca ctttactcat
121 ggccaggttg cgtttttgtg cagacaatgt gatcctccac tttttctgtg atatgtctgc
181 tctgctgaag ctggcctgct ctgacactcg agttaatgaa ttggtgatat ttatcatggg
241 aggcctcatt cttgtcatcc catttctact tatcattggg tcctacgcac gaattgtctt
301 ctccatcctc aaggtccctt cttctaaggg tatctgcaag gccgtctcta cttgtggctc

361 ccacctctct gtggtgtcac tgttctatgg gactgttatt ggtctctact tatgcccatc
421 agctaataat tctactctaa aggagactgt catggctgtg atgtacactg tgatggcccc
481 catgctg (SEQ ID NO:336).

OR206

LOCUS AF179827 487 bp DNA PRI 31-DEC-2000
DEFINITION Saimiri sciureus olfactory receptor (SSC190) gene, partial cds.
ACCESSION AF179827
KEYWORDS .
SOURCE common squirrel monkey.
ORGANISM Saimiri sciureus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
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/db_xref="taxon:9521"
gene <1..>487
/gene="SSC190"
CDS <1..>487
/gene="SSC190"
/codon_start=2
/product="olfactory receptor"
/translation="VAICKPLHYTTIMSSKICLQLVLGCWVLGFLIIFPPLLLGLNLD
FCASNVVDHFYFDTIPLLQISCTDTQLLERMGFISALVTLLVTLVMVIISYTYIALTI
LKIPSTSQRKKAFSTCSSHMIVISLSYGSCIFMYVKPSVKQRVSFSKGISVLNTSVAP
LL" (SEQ ID NO:339).
BASE COUNT 112 a 124 c 91 g 160 t
ORIGIN
1 tgtggccatc tgtaagcccc tgcattacac caccatcatg agcagcaaaa tctgcctgca
61 gcttgtgctt gggtgctggg ttcttggttt tctcatcatc tttccaccac tcctcttagg
121 actaaatctt gacttctgtg cctccaacgt cgttgatcat ttctactttg acactatccc
181 gctcctgcag atttcctgca cagacacgca gctcctggag aggatgggat tcatctcagc
241 gttggtgaca ctcttagtca cattggtaat ggtgataata tcatatactt atattgccct
301 gacaattcta aaaatccctt caactagtca gaggaaaaag gctttttcca cgtgttcttc
361 tcacatgatt gtgatatccc tttcttatgg cagctgcatc ttcatgtatg ttaagccatc
421 agtcaaacaa agggtatctt tttcaaaggg aatttcggtg ctcaatacct ctgttgctcc
481 acttttg (SEQ ID NO:338).

OR207

LOCUS AF179828 485 bp DNA PRI 31-DEC-2000
DEFINITION Saimiri sciureus olfactory receptor (SSC191) gene, partial cds.
ACCESSION AF179828

KEYWORDS .
SOURCE common squirrel monkey.
ORGANISM Saimiri sciureus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.
REFERENCE 1 (bases 1 to 485)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 485)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
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gene <1..>485
/gene="SSC191"
CDS <1..>485
/gene="SSC191"
/codon_start=1
/product="olfactory receptor"
/translation="VAICHPLQYSVIMTTGYCGQLVAFSYMSGFMISVIKVYFISHVA
FCGSNVMNHFFCDISPVLKLACKDMSTAELVDFALAIVILVIPLITTILSYIYIVSAI
LHIPSTQGRKKAFSTCASHLTVVIIFYTAMIFTYVRPRAIASFNSNKLMSAVYAVLTP
ML" (SEQ ID NO:341).
BASE COUNT 111 a 134 c 80 g 160 t
ORIGIN
1 gtggccattt gccaccctct tcaatactca gtcatcatga ccacaggtta ctgtggacag
61 ctggtggctt tctcttacat gagtggtttc atgatctctg tcatcaaggt ctatttcatt
121 tcacatgttg ctttctgtgg ctccaatgtt atgaaccact ttttctgtga tatctcacca
181 gtcctaaaac tggcatgcaa agacatgtcc acagctgagc tagtggactt tgctttagct
241 atcgtcattc ttgtgatccc tctcattacc actatcctct cctatatcta cattgtctcc
301 gccattctgc atataccctc cacccaggga aggaagaagg ccttctccac ctgtgcatct
361 cacctcactg tagtcataat tttttacaca gccatgattt ttacatatgt tcggcccaga
421 gctattgcat catttaattc caacaaacta atgtcagctg tgtatgcagt cctcacaccc
481 atgct (SEQ ID NO:340).

OR208

LOCUS AF179829 487 bp DNA PRI 31-DEC-2000
DEFINITION Saimiri sciureus olfactory receptor (SSC192) gene, partial cds.
ACCESSION AF179829
KEYWORDS .
SOURCE common squirrel monkey.
ORGANISM Saimiri sciureus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Saimiri sciureus"
/db_xref="taxon:9521"
gene <1..>487
/gene="SSC192"
CDS <1..>487
/gene="SSC192"
/codon_start=2
/product="olfactory receptor"
/translation="VAICYPLHYTAIMREGLCAFLVAVSWIPSCASSLSHTLLLTPLS
FCDANTVHHFFCDLAALLKLSCSDIFLNELVMFTVGVVVITLPFMCILVSYGYTGATI
LRVPSTKGIRKALSMCGSRLSVVSLYYGSIFGQYLFPTVSSSIDKDVIVALMYTVVTP
ML" (SEQ ID NO:343).
BASE COUNT 88 a 141 c 106 g 152 t
ORIGIN
1 tgttgccata tgttaccctc tccactacac tgccatcatg agggaagggc tctgtgcctt
61 cttagtggct gtatcttgga ttccatcttg tgctagctcc ctctctcaca cccttctgct
121 gaccccgctg tctttctgtg atgcaaacac cgtccaccac ttcttctgtg accttgctgc
181 cctgctcaag ctgtcctgct cagatatctt cctcaatgag ctggtcatgt tcacagtagg
241 ggtggtggtc attaccctgc cattcatgtg tatcctggta tcatatggct acactggggc
301 cactatcctg agggtcccct caaccaaagg gatccgcaaa gcgttgtcca tgtgtggctc
361 ccgtctctct gtggtgtctc tgtattatgg ctcaatattt ggccagtacc ttttcccaac
421 tgtaagcagt tccattgaca aggatgtcat tgtggctcta atgtacacag tggtcacacc
481 catgctg (SEQ ID NO:342).

OR209

LOCUS AF179830 487 bp DNA PRI 31-DEC-2000
DEFINITION Saimiri sciureus olfactory receptor (SSC193) gene, partial cds.
ACCESSION AF179830
KEYWORDS .
SOURCE common squirrel monkey.
ORGANISM Saimiri sciureus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
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/db_xref="taxon:9521"
gene <1..>487
/gene="SSC193"
CDS <1..>487
/gene="SSC193"
/codon_start=2
/product="olfactory receptor"
/translation="VAICYPLHYTAIMREGLCAFLVAVSWIPSCASSLSHTLLLTPLS
FCDANTVHHFFCDLAALLKLSCSDIFLNELVMFTVGVVVITLPFMCILVSYGYTGATI
LRVPSTKGIRKALSMCGSRLSVVSLYYGSIFGQYLFPTVSSSIDKDVIVALTYTVVTP
ML" (SEQ ID NO:345).

BASE COUNT 88 a 143 c 106 g 150 t

ORIGIN

1 tgttgccata tgttaccctc tccactacac tgccatcatg agggaagggc tctgtgcctt
61 cttagtggct gtatcttgga ttccatcttg tgctagctcc ctctctcaca cccttctgct
121 gaccccgctg tctttctgtg atgcaaacac cgtccaccac ttcttctgtg accttgctgc
181 cctgctcaag ctgtcctgct cagatatctt cctcaatgag ctggtcatgt tcacagtagg
241 ggtggtggtc attaccctgc cattcatgtg tatcctggta tcatatggct acactggggc
301 caccatcctg agggtcccct caaccaaagg gatccgcaaa gcgttgtcca tgtgtggctc
361 ccgtctctct gtggtgtctc tgtattatgg ctcaatattt ggccagtacc ttttcccaac
421 tgtaagcagt tccattgaca aggatgtcat tgtggctcta acgtacacag tggtcacacc
481 catgctg (SEQ ID NO:344).

OR210

LOCUS AF179831 486 bp DNA PRI 31-DEC-2000

DEFINITION Saimiri sciureus olfactory receptor (SSC194) gene, partial cds.

ACCESSION AF179831

KEYWORDS .

SOURCE common squirrel monkey.

ORGANISM Saimiri sciureus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.

REFERENCE 1 (bases 1 to 486)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 486)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..486
/organism="Saimiri sciureus"
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gene <1..>486
/gene="SSC194"
CDS <1..>486
/gene="SSC194"
/codon_start=2
/product="olfactory receptor"
/translation="VAICHPLHYTVTINPRLCGLLVLASWILSALNSSLQTLIVLRLS
FCTDLEIPHFFCELNQVIHLACYDTFLNDVVMYLAAMLLGGGPLTGIIYSYSKIVSSI

RAISSAQGKYKAFSTCASHILIVSLFYGTLLGVYISSAATGNSHSSAAALVMYTVVTP
ML" (SEQ ID NO:347).

BASE COUNT 102 a 133 c 97 g 154 t

ORIGIN

1 tgtggccatc tgtcaccccc tgcactacac agtcaccatt aaccccagac tgtgtggact
61 gctggttctg gcatcctgga tcctgagtgc cctgaattcc tcattacaaa ccttaatagt
121 gctgcggctt tccttctgca cagacttgga aatcccccac tttttctgcg aacttaatca
181 ggtcatacat cttgcctgtt atgacacttt ccttaatgat gtggtgatgt atttggcagc
241 tatgctgctg ggcggtggtc ccctcacagg aattatttac tcttactcta agatagtttc
301 ctccatacgt gcaatctcat cagctcaggg gaagtacaag gcgttttcca cctgtgcatc
361 tcacatctta attgtctcct tattttatgg tacactccta ggtgtgtaca ttagttctgc
421 tgcaactggc aactcacatt caagtgctgc agccttggtg atgtacactg tggtcacccc
481 catgct (SEQ ID NO:346).

OR211

LOCUS AF179832 487 bp DNA PRI 31-DEC-2000
DEFINITION Saimiri sciureus olfactory receptor (SSC195) gene, partial cds.
ACCESSION AF179832
KEYWORDS .
SOURCE common squirrel monkey.
ORGANISM Saimiri sciureus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Saimiri sciureus"
/db_xref="taxon:9521"
gene <1..>487
/gene="SSC195"
CDS <1..>487
/gene="SSC195"
/codon_start=2
/product="olfactory receptor"
/translation="VAICNPLLYMVTMSPQVCLLLLLGVYGMGVLGAVAHMGNIMFMT
FCSENLVNHYMCDVLPLLELSCNSSYINLLLVFIIVAIGIGVPIVTIFISYGFILSSI
LHISSTEGRSKAFSTCSSHIIVVSLFFGSGAFMYLKPPSILPLDQGKVSSIFYTAVVP
MF" (SEQ ID NO:349).

BASE COUNT 92 a 116 c 105 g 174 t

ORIGIN

1 cgtggccatc tgtaacccac tgctgtacat ggtcaccatg tctccccagg tgtgcttgct
61 ccttttgttg ggtgtctatg ggatgggggt tttgggggct gtggctcata tgggaaacat
121 aatgtttatg acctttttgtt cagaaaatct tgtcaatcac tacatgtgtg atgtccttcc
181 cctccttgag ctctcctgca acagctctta cataaatttg ctgttggttt ttattattgt
241 ggccattggc attggggtgc caattgtcac catttttatc tcttatggtt ttattctttc

301 cagcattctc cacattagct ccacagaggg caggtctaaa gccttcagta cctgcagctc
361 ccacataatt gtggtatcgc ttttctttgg gtcaggagct tttatgtacc tcaaaccacc
421 ttctattcta cccctggacc aggggaaagt gtcttccatt ttttatactg cagtggtgcc
481 catgttt (SEQ ID NO:348).

OR212

LOCUS AF179833 486 bp DNA PRI 31-DEC-2000
DEFINITION Saimiri boliviensis SBO213 pseudogene, partial sequence.
ACCESSION AF179833
KEYWORDS .
SOURCE Bolivian squirrel monkey.
ORGANISM Saimiri boliviensis
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.
REFERENCE 1 (bases 1 to 486)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 486)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..486
/organism="Saimiri boliviensis"
/db_xref="taxon:27679"
gene <1..>486
/gene="SBO213"
/pseudo
BASE COUNT 107 a 151 c 87 g 141 t
ORIGIN
1 cgtggccatc tgccaccctc tccactatcc catccgcatg agtagaagtg tgtgtgtgaa
61 gatgattgga ggctcttgga cgctggggtc catcaactcc ttggcacaca cagtctatgc
121 cctccatatt ccctactgca ggtctagagc cattgaccat ttcttctgcg acatcccagc
181 catgttgctt ctcgcctgta cggacacttg ggtctatgaa tacatggttt ttctaagtac
241 aagctgcctt ctcctctttc tttccttggc atcaccgctt cctatggccg agtcctattt
301 gctgtctacc atacgcattc aaaaaaggga agaaaaaagg cctccaccac catttcaacc
361 catttaactg tagtgatctt ttactatgca ccttttgtct acacctatct tcggcccagg
421 aatctccact caccatccga agacaagatc ctggcagtct tctacaccat ccttaccccc
481 atgctc (SEQ ID NO:350).

OR213

LOCUS AF179834 487 bp DNA PRI 31-DEC-2000
DEFINITION Saimiri boliviensis olfactory receptor (SBO214) gene, partial cds.
ACCESSION AF179834
KEYWORDS .
SOURCE Bolivian squirrel monkey.
ORGANISM Saimiri boliviensis
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.
REFERENCE 1 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Saimiri boliviensis"
/db_xref="taxon:27679"
gene <1..>487
/gene="SBO214"
CDS <1..>487
/gene="SBO214"
/codon_start=2
/product="olfactory receptor"
/translation="VAICKPLHYTTIMSSKICLQLVLGCWVLGFLIIFPPLLLGLNLD
FCASNVVDHFYCDTIPLLQISCTDTQLLERMGFISALVTLLVTLVMVIISYTYIALTI
LKIPSTSQRKKAFSTCSSHMIVISLSYGSCIFMYVKPSVKQRVSFSKGISVLNTSVAP
LL" (SEQ ID NO:352).
BASE COUNT 112 a 125 c 92 g 158 t
ORIGIN
1 tgtggccatc tgtaagcccc tgcattacac caccatcatg agcagcaaaa tctgcctgca
61 gcttgtgctt gggtgctggg ttcttggttt tctcatcatc tttccaccac tcctcttagg
121 actaaatctt gacttctgtg cctccaacgt cgttgatcat ttctactgtg acactatccc
181 gctcctgcag atttcctgca cagacacgca gctcctggag aggatgggat tcatctcagc
241 gctggtgaca ctcttagtca cattggtaat ggtgataata tcatatactt atattgccct
301 gacaattcta aaaatccctt caactagtca gaggaaaaag gctttttcca cgtgttcttc
361 tcacatgatt gtgatatccc tttcttatgg cagctgcatc ttcatgtatg ttaagccatc
421 agtcaaacaa agggtatctt tttcaaaggg aatttcggtg ctcaatacct ctgttgctcc
481 acttttg (SEQ ID NO:351).

OR214

LOCUS AF179835 487 bp DNA PRI 31-DEC-2000
DEFINITION Saimiri boliviensis olfactory receptor (SBO215) gene, partial cds.
ACCESSION AF179835
KEYWORDS .
SOURCE Bolivian squirrel monkey.
ORGANISM Saimiri boliviensis
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers
source 1..487
/organism="Saimiri boliviensis"
/db_xref="taxon:27679"
gene <1..>487
/gene="SBO215"
CDS <1..>487
/gene="SBO215"
/codon_start=2
/product="olfactory receptor"
/translation="VAICFPLHYTLLMSHSICVNTVIVCWSISIAGALIYTVFTLHLP
YCGPYKINHFFCEVPAVLKLACADTSFNDRLDFILGFLLLLVPLSFILASYVLIFASI
FRIRSVQGRLKSFSTCASHVTVVTMFYGPAIIMYMRPGSWYDPEWDKKVEVLYNVISA
FL" (SEQ ID NO:354).
BASE COUNT 86 a 142 c 104 g 155 t
ORIGIN
1 cgttgccatt tgcttccccc ttcactatac gctactcatg agccattcca tttgtgtcaa
61 cacggtcatt gtctgttggt ccattagcat agctggggcc ctgatctaca ctgtcttcac
121 cttgcatctg ccttattgtg gcccctacaa gataaaccac ttcttctgtg aggtccctgc
181 tgtcctgaag ttggcctgtg cagacacatc ttttaatgac aggctggact tcattttggg
241 tttcctcctg cttttggtcc cactctcctt catcctggcc tcttacgtac tcatctttgc
301 ctctatcttc agaatccgct cagtgcaggg gaggctcaag tccttctcca cgtgtgcttc
361 ccacgtcact gtggtcacca tgttctacgg accggccatc atcatgtaca tgaggcccgg
421 ttcttggtat gacccagagt gggacaagaa ggtagaggtg ttgtacaatg tcatctctgc
481 cttcttg (SEQ ID NO:353).

OR215

LOCUS AF179836 487 bp DNA PRI 31-DEC-2000
DEFINITION Saimiri boliviensis olfactory receptor (SBO216) gene, partial cds.
ACCESSION AF179836
KEYWORDS .
SOURCE Bolivian squirrel monkey.
ORGANISM Saimiri boliviensis
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Saimiri boliviensis"
/db_xref="taxon:27679"
gene <1..>487
/gene="SBO216"
CDS <1..>487
/gene="SBO216"
/codon_start=2

/product="olfactory receptor"
/translation="VAICQPLHYSTLLSPQACMTMVGTSWLTGIITATTHASLIFSLP
FPSHPMIPHFLCDILPVLRLASAGKHRSEISVMTATVVFIMVPFSMIVTSYIRILGAI
LAMTSTQSRHKVFSTCSSHLLVVCLFFGTASITYIRPQAGSSVTTDRILSLFYTVITP
ML" (SEQ ID NO:356).
BASE COUNT 93 a 186 c 89 g 119 t
ORIGIN
1 tgttgccatc tgccagcccc tgcactactc caccctcttg agcccacagg cctgcatgac
61 catggtgggc acctcctggc tcacaggcat catcacagcc accacccatg cctccctcat
121 cttctctctg cccttcccca gccacccaat gatcccacac tttctctgtg acatcctgcc
181 agtactgaga ctggcaagtg ctgggaagca caggagtgag atctccgtga tgacagctac
241 cgtagtcttc atcatggtcc ctttctctat gattgtcacc tcttacatcc gcatcctggg
301 tgccatccta gcaatgactt ccacccagag ccgccacaag gtcttctcca cctgctcctc
361 ccatctgctt gtggtctgtc tcttctttgg aacagccagc atcacctaca tacggcccca
421 ggcaggctcc tctgtcacca cagaccgcat cctcagtctc ttctacacgg tcatcacacc
481 catgctc (SEQ ID NO:355).

OR216

LOCUS AF179837 487 bp DNA PRI 31-DEC-2000
DEFINITION Saimiri boliviensis olfactory receptor (SBO217) gene, partial cds.
ACCESSION AF179837
KEYWORDS .
SOURCE Bolivian squirrel monkey.
ORGANISM Saimiri boliviensis
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Saimiri boliviensis"
/db_xref="taxon:27679"
gene <1..>487
/gene="SBO217"
CDS <1..>487
/gene="SBO217"
/codon_start=2
/product="olfactory receptor"
/translation="VAICHPLYYSTVMSPQVCALILVLCWVLTNVVALTHTLLMARLS
FCVTGEIAHFFCDITPVLKLSCSDTHINEMMVFVLGGTVLIIPFLCIVTSYIYIVPAI
LRVRTHGGAGKAFSTCSSHLCIVCVFYGTLFSAYLCPPSIASEDKDIATAAMYTIVTP
TL" (SEQ ID NO:358).
BASE COUNT 89 a 151 c 100 g 147 t
ORIGIN
1 tgtggccatt tgccaccccc tctactactc cacagtcatg agcccccaag tctgtgccct
61 aatcctcgtg ttgtgctggg tcctcaccaa cgttgttgcc ttgacccaca cactcctcat

121 ggctcgactg tccttctgtg tgactgggga aattgctcac tttttctgtg acatcactcc
181 tgtcctgaag ctatcatgtt ctgacaccca catcaatgag atgatggttt ttgtcttggg
241 aggcacagta ctcatcatcc cctttctatg cattgtcacc tcctacatct acattgtgcc
301 tgctattctg agggtccgaa cccatggtgg ggcgggcaag gccttttcca cctgcagttc
361 ccacctctgc attgtttgtg tgttctatgg gaccctcttc agtgcctacc tgtgtcctcc
421 ctccatcgcc tctgaagata aggacattgc aacagctgca atgtatacca tagtgactcc
481 cacgttg (SEQ ID NO:357).

OR217

LOCUS AF179838 486 bp DNA PRI 31-DEC-2000
DEFINITION Saimiri boliviensis olfactory receptor (SBO218) gene, partial cds.
ACCESSION AF179838
KEYWORDS .
SOURCE Bolivian squirrel monkey.
ORGANISM Saimiri boliviensis
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.
REFERENCE 1 (bases 1 to 486)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 486)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..486
/organism="Saimiri boliviensis"
/db_xref="taxon:27679"
gene <1..>486
/gene="SBO218"
CDS <1..>486
/gene="SBO218"
/codon_start=2
/product="olfactory receptor"
/translation="VAICNPLLYMVTMSPQVCLLLLLGVYGMGVLGAVAHMGNIMFMT
FCSENLVNHYMCDVLPLLELSCNSSYINLLLVFIIVAIGIGVPIVTIFISYGFILSSI
LHISSTEGRSKAFSTCSSHIIVVSLFFGSGAFMYLKPPSILPLDQGKVSSIFYTAVVP
C" (SEQ ID NO:360).
BASE COUNT 92 a 114 c 105 g 175 t
ORIGIN
1 cgtggctatc tgtaacccac tgctgtacat ggtcaccatg tctccccagg tgtgcttgct
61 ccttttgttg ggtgtctatg ggatgggggt tttgggggct gtggctcata tgggaaacat
121 aatgtttatg acctttttgtt cagaaaatct tgtcaatcac tacatgtgtg atgtccttcc
181 cctccttgag ctctcctgca acagctctta cataaatttg ctgttggttt ttattattgt
241 ggccattggc attggggtgc caattgtcac catttttatc tcttatggtt ttattctttc
301 cagcattctc cacattagct ccacagaggg caggtctaaa gccttcagta cctgcagctc
361 ccacataatt gtggtatcgc ttttctttgg gtcaggagct tttatgtacc tcaaaccacc
421 ttctattcta cccctggacc aggggaaagt gtcttccatt ttttatactg cagtggtgcc
481 atgttt (SEQ ID NO:359).

OR218

LOCUS AF179839 487 bp DNA PRI 31-DEC-2000
DEFINITION Saimiri boliviensis olfactory receptor (SBO219) gene, partial cds.
ACCESSION AF179839
KEYWORDS .
SOURCE Bolivian squirrel monkey.
ORGANISM Saimiri boliviensis
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Saimiri boliviensis"
/db_xref="taxon:27679"
gene <1..>487
/gene="SBO219"
CDS <1..>487
/gene="SBO219"
/codon_start=2
/product="olfactory receptor"
/translation="VAICHPLQYSVIMTTGYCGQLVAFSYMSGFMISVIKVYFISHVA
FCGSNVMNLFFCDISPVLKLACKDMSTAELVDFALAIVILVIPLITTILSYIYIVSAI
LHIPSTQGRKKAFSTCASHLTVVIIFYTAMIFTYVRPRAIASFNSNKLISAVYAVLTP
ML" (SEQ ID NO:362).
BASE COUNT 111 a 136 c 78 g 162 t
ORIGIN
1 tgtggccatt tgccaccctc ttcaatactc agtcatcatg accacaggtt actgtggaca
61 gctggtggct ttctcttaca tgagtggttt catgatctct gtcatcaagg tctatttcat
121 ttcacatgtt gctttctgtg gctccaatgt tatgaacctc tttttctgtg atatctcacc
181 agtcctaaaa ctggcatgca aagacatgtc cacagctgag ctagtggact ttgctttagc
241 tatcgtcatt cttgtgatcc ctctcattac cactatcctc tcctatatct acattgtctc
301 cgccattctg catataccct ccacccaggg aaggaagaag gccttctcca cctgtgcatc
361 tcacctcact gtagtcataa ttttttacac agccatgatt tttacatatg ttcggcccag
421 agctattgca tcatttaatt ccaacaaact aatctcagct gtctatgcag tcctcacacc
481 catgcta (SEQ ID NO:361).

OR219

LOCUS AF179840 488 bp DNA PRI 31-DEC-2000
DEFINITION Saimiri boliviensis SBO220 pseudogene, partial sequence.
ACCESSION AF179840
KEYWORDS .
SOURCE Bolivian squirrel monkey.
ORGANISM Saimiri boliviensis
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.

REFERENCE 1 (bases 1 to 488)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 488)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..488
/organism="Saimiri boliviensis"
/db_xref="taxon:27679"
gene <1..>488
/gene="SBO220"
/pseudo
BASE COUNT 112 a 126 c 92 g 158 t
ORIGIN
1 tgtggccatc tgtaagcccc tgcattacac caccatcatg agcagcaaaa tctgcctgca
61 gcttgtgctt gggtgctggg ttcttggttt tctcatcatc tttccaccac tcctcttagg
121 actaaatctt gacttctgtg cctccaacgt cgttgatcat ttctactgtg acactatccc
181 gctcctgcag atttcctgca cagacacgca gctcctggag aggatgggat tcatctcagc
241 gctggtgaca ctcttagtca cattggtaat ggtgataata tcatatactt atattgccct
301 gacaattcta aaaatccctt caactagtca gaggaaaaag gctttttcca cgtgttcttc
361 tcacatgatt gtgatatccc tttcttatgg cagctgccat cttcatgtat gttaagccat
421 cagtcaaaca aagggtatct ttttcaaagg gaatttcggt gctcaatacc tctgttgctc
481 cacttttg (SEQ ID NO:363).

OR220

LOCUS AF179841 487 bp DNA PRI 31-DEC-2000
DEFINITION Saimiri boliviensis olfactory receptor (SBO221) gene, partial cds.
ACCESSION AF179841
KEYWORDS .
SOURCE Bolivian squirrel monkey.
ORGANISM Saimiri boliviensis
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Saimiri boliviensis"
/db_xref="taxon:27679"
gene <1..>487
/gene="SBO221"

CDS <1..>487
/gene="SBO221"
/codon_start=2
/product="olfactory receptor"
/translation="VAICLPLHYATIMSPMLSRSLVALSWVLTTFHAMLHTLLIARLR
FCADNVIFHFFCDMSALLKLACSDTRVNELVIFIMGGLILVIPFLLIIGSYARIVFSI
LKVPSSKGICKAVSTCGSHLSVVSLFYGTVIGLYLCPSANNSTLKETVMAVMYTVMAP
ML" (SEQ ID NO:365).
BASE COUNT 85 a 139 c 103 g 160 t
ORIGIN
1 cgtggccatc tgcctccccc tacattacgc caccatcatg agccccatgc tgtctcgctc
61 cctggtggcg ctgtcctggg tgctgaccac cttccatgcc atgttgcaca ctttactcat
121 agccaggttg cgtttttgtg cagacaatgt gatcttccac tttttctgtg atatgtctgc
181 tctgctgaag ctggcctgct ctgacactcg agttaatgaa ttggtgatat ttatcatggg
241 aggcctcatt cttgtcatcc catttctact tatcattggg tcctacgcac gaattgtctt
301 ctccatcctc aaggtccctt cttctaaggg tatctgcaag gccgtctcta cttgtggctc
361 ccacctctct gtggtgtcac tgttctatgg gactgttatt ggtctctact tatgcccatc
421 agctaataat tctactctaa aggagactgt catggctgtg atgtacactg tgatggcccc
481 catgctg (SEQ ID NO:364).

OR221

LOCUS AF179842 487 bp DNA PRI 31-DEC-2000
DEFINITION Saimiri boliviensis olfactory receptor (SBO222) gene, partial cds.
ACCESSION AF179842
KEYWORDS .
SOURCE Bolivian squirrel monkey.
ORGANISM Saimiri boliviensis
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Saimiri boliviensis"
/db_xref="taxon:27679"
gene <1..>487
/gene="SBO222"
CDS <1..>487
/gene="SBO222"
/codon_start=2
/product="olfactory receptor"
/translation="VAICNPLLYMVTMSPQVCLLLLLGVYGMGVLGAVAHTGNIVFLT
FCAGNLVNHYMCDILPLLELSCNGSYINVLVIFIVVTIGIGVPIVAIFISYGFILSSN
LHISSAEGRSKAFSTCSSHIIAVSLFFGSGAFMYLKPSSVLPLDQGKVSSLFYTIVVP
MF" (SEQ ID NO:367).
BASE COUNT 86 a 120 c 105 g 176 t

ORIGIN
1 cgtggccatc tgtaacccac tgctgtacat ggtcaccatg tctccccagg tgtgtttgct
61 ccttttgttg ggtgtctatg ggatgggggt tttgggggct gtggctcata caggaaatat
121 agtgtttcta acctttttgtg caggcaacct tgtcaatcac tacatgtgtg acatccttcc
181 ccttcttgag ctctcctgca atggctctta cataaatgtt ctggtcatct ttattgttgt
241 gaccattggc attggggtgc ccattgttgc cattttatc tcttatggtt ttattctttc
301 cagcaatctc cacattagtt ctgctgaggg caggtctaaa gccttcagta cctgcagctc
361 ccacataatt gcagtttctc ttttcttcgg gtcaggagct tttatgtacc tcaaaccctc
421 ttccgtttta cccctggacc aggggaaagt atcctccctg ttttatacta ttgtggtgcc
481 catgttt (SEQ ID NO:366).

OR222

LOCUS AF179843 487 bp DNA PRI 31-DEC-2000
DEFINITION Saimiri boliviensis olfactory receptor (SBO223) gene, partial cds.
ACCESSION AF179843
KEYWORDS .
SOURCE Bolivian squirrel monkey.
ORGANISM Saimiri boliviensis
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Saimiri boliviensis"
/db_xref="taxon:27679"
gene <1..>487
/gene="SBO223"
CDS <1..>487
/gene="SBO223"
/codon_start=2
/product="olfactory receptor"
/translation="VAICHPLHYTVTINPRLCGLLVLASWILSALNSSLQTLIVLRLS
FCTDLEIPHFFCELNQVIHLACYDTFLNDVVMYLAAMLLGGGPLTGIIYSYSKIVSSI
RAISSAQGKYKAFSTCASHILIVSLFYGTLLGVYLSSAATGNSHSSAAALVMYTVVTP
ML" (SEQ ID NO:369).
BASE COUNT 101 a 134 c 98 g 154 t
ORIGIN
1 tgtggccatc tgtcaccccc tgcactacac agtcaccatt aaccccagac tgtgtggact
61 gctggttctg gcatcctgga tcctgagtgc cctgaattcc tcattacaaa ccttaatagt
121 gctgcggctt tccttctgca cagacttgga aatccccccac tttttctgcg aacttaatca
181 ggtcatacat cttgcctgtt atgacacttt ccttaatgat gtggtgatgt atttggcagc
241 tatgctgctg ggcggtggtc ccctcacagg aattatttac tcttactcta agatagtttc
301 ctccatacgt gcaatctcat cagctcaggg gaagtacaag gcgttttcca cctgtgcatc
361 tcacatctta attgtctcct tattttatgg tacactccta ggtgtgtacc ttagttctgc
421 tgcaactggc aactcacatt caagtgctgc agccttggtg atgtacactg tggtcacccc

481 catgctg (SEQ ID NO:368).

OR223

LOCUS AF073959 649 bp DNA ROD 12-JUL-1999
DEFINITION Mus musculus domesticus clone OR1-72M15 olfactory receptor gene, partial cds.
ACCESSION AF073959
KEYWORDS .
SOURCE western European house mouse.
ORGANISM Mus musculus domesticus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia; Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are potentially functional
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Direct Submission
JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5, France
FEATURES Location/Qualifiers
source 1..649
/organism="Mus musculus domesticus"
/sub_species="domesticus"
/db_xref="taxon:10092"
/clone="OR1-72M15"
mRNA <1..>649
/product="olfactory receptor"
CDS <1..>649
/note="region between transmembrane domains TM2 and TM7."
/codon_start=2
/product="olfactory receptor"
/translation="IADIGFTSTTIPKVLQTIHTQSKFISFSGCITQIFFFIVFGCLD
NLLLSVMAYDRFVAICHPLHYVVIMNSCFCVMLALGSWIVSVMSSLPETLTVLRLSFC
TNMEIPHFFCDLPEVLKLACSDTLVNNIVTYSITIVIAGFPFSGILLSYSKIFSSILR
IPSAGGKYKAFSTCGSHLLVVFLFYSNGLGVYLSSAATSSSRMSLVASLMYSIVTP" (SEQ ID NO:371).
BASE COUNT 139 a 171 c 119 g 220 t
ORIGIN
1 catagctgac atcggcttca cctccaccac tatccccaag gttctgcaga ctatccacac
61 acagagcaaa ttcatctctt tctcgggctg catcacacag atatttttct tcattgtgtt
121 tggatgcctg gacaatttac tcctatcagt gatggcctat gaccgctttg tggccatctg
181 ccatcccttg cactatgtgg tcatcatgaa ttcttgcttc tgtgtgatgc tggctcttgg
241 atcatggata gtcagcgtca tgagttccct acctgagacc ttgactgtgt taagactatc
301 cttctgtaca aacatggaaa ttccacactt tttctgtgat cttcccgaag tcctgaagct
361 tgcctgttct gacacccttg ttaataacat tgtgacatat tctataacca tagtcatagc
421 tggtttccca ttctctggga ttctattgtc ttattctaag attttctcct ccatcctaag
481 aattccttca gctgggggca agtacaaagc cttttctacc tgtgggtctc atcttttggt
541 ggtcttctta ttctatagca atggtcttgg ggtctacctc agctctgcag ccacatcatc
601 ttctagaatg agtctagttg cctcactgat gtacagcata gtcactccc (SEQ ID NO:370).

OR224

LOCUS AF073960 649 bp DNA ROD 12-JUL-1999
DEFINITION Mus musculus domesticus clone OR1-72M16 olfactory receptor gene, partial cds.
ACCESSION AF073960
KEYWORDS .
SOURCE western European house mouse.
ORGANISM Mus musculus domesticus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia; Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are potentially functional
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Direct Submission
JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5, France
FEATURES Location/Qualifiers
source 1..649
/organism="Mus musculus domesticus"
/sub_species="domesticus"
/db_xref="taxon:10092"
/clone="OR1-72M16"
mRNA <1..>649
/product="olfactory receptor"
CDS <1..>649
/note="region between transmembrane domains TM2 and TM7."
/codon_start=2
/product="olfactory receptor"
/translation="FSDFCFSSVTIPKLLQNMQSQVPSIPYAGCLAQMYFFLLFADLE
SFLLVAMAYDRYVAICFPLHYTSIMSPKLCLCLVALSWLLTTVISLSHTLLMARLSFC
ANNVIPHFFCDMSALLKLACSDIQINKLMIFILGGLVIIVPFLLIFSSYARIVSSILK
VPSSRSIRKAFSTCGSHLSVVSLFYGTIIGLYLRPSANNSTIKETVMAVMYTVVTP" (SEQ ID NO:373).
BASE COUNT 129 a 184 c 120 g 216 t
ORIGIN
1 cttctctgac ttctgctttt cctctgtgac cattcccaaa ttgctgcaga acatgcaaag
61 ccaagttcca tccataccct atgcaggttg cctggcacaa atgtactttt tcctgctttt
121 tgcagatctc gagagcttcc tccttgtggc catggcctat gatcgctatg tggccatctg
181 cttcccccta cactatacta gcatcatgag ccccaagctg tgtctctgcc tggtggcact
241 atcttggcta ctgaccacag tcatctcttt gtcacacaca ctgctcatgg ctcggctctc
301 cttctgtgct aacaatgtga ttcctcactt tttctgtgat atgtcagctc ttctgaagtt
361 agcctgctct gacattcaga tcaataagtt gatgatattt atcttgggag gacttgtcat
421 tattgtccca ttcctgctga tattttcatc ctatgcacga atagtgtcct ccattctcaa
481 ggtccctct tctagaagca tccgcaaggc cttctccacc tgtggttccc acctctctgt
541 ggtgtctctt ttctatggga caatcattgg tctctattta cgtccatcag ctaataattc
601 aaccattaag gagactgtca tggctgtgat gtacacggtg gtgacccct (SEQ ID NO:372).

OR225

LOCUS AF073961 649 bp DNA ROD 12-JUL-1999
DEFINITION Mus musculus domesticus clone OR10M olfactory receptor gene, partial cds.
ACCESSION AF073961
KEYWORDS .
SOURCE western European house mouse.
ORGANISM Mus musculus domesticus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia; Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are potentially functional
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Direct Submission
JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5, France
FEATURES Location/Qualifiers
source 1..649
/organism="Mus musculus domesticus"
/sub_species="domesticus"
/db_xref="taxon:10092"
/clone="OR10M"
mRNA <1..>649
/product="olfactory receptor"
CDS <1..>649
/note="region between transmembrane domains TM2 and TM7."
/codon_start=2
/product="olfactory receptor"
/translation="FSDLCFSSVTMPKLLQNMQSQDSSITYAGCLTQMYFFLLFGDLE
SFLLVAMAYDRYVAICFPLHYMSIMSPSLCVSLVLLSWVLTTFHAMLHTLLMARLSFC
EDNVIPHFFCDMSALLKLSCSDTHVNELVIFVTGGLILVIPFVLILVSYARIVSSILK
VPSARGIRKAFSTCGSHLSVVSLFYGAIIGLYLCPSADNSTVKETVMAMMYTVVTP" (SEQ ID NO:375).
BASE COUNT 120 a 185 c 141 g 203 t
ORIGIN
1 cttctctgat ctctgctttt cctctgtcac aatgcccaaa ttgctgcaga acatgcagag
61 ccaggactca tccatcacct atgcaggatg cctgacacaa atgtactttt tcttgctctt
121 tggagacctt gagagcttcc tccttgtggc catggcctat gaccgctatg tggccatctg
181 cttccccctt cattacatga gcatcatgag ccccagcctc tgtgtgagtc tggtgctgct
241 gtcctgggtg ctgaccactt tccatgccat gctgcatacc ctgctcatgg ccagattgtc
301 attctgtgag gacaatgtga tcccccactt tttctgtgac atgtctgctc tgctgaagct
361 gtcctgctct gacactcacg ttaatgaatt ggtgatattt gtcacaggag gcctgatcct
421 tgtcattcca tttgtgctca tccttgtgtc ctatgcacga attgtgtcct ccattctcaa
481 ggtcccgtct gctcgaggca tccgtaaagc cttctccacc tgtgggtccc acctgtctgt
541 ggtgtcactg ttctatgggg caatcattgg tctgtactta tgtccatcag ctgataactc
601 tactgtgaag gaaactgtca tggccatgat gtacacagtg gtgactccc (SEQ ID NO:374).

OR226

LOCUS AF073962 649 bp DNA ROD 12-JUL-1999
DEFINITION Mus musculus domesticus clone OR11M olfactory receptor gene, partial cds.
ACCESSION AF073962
KEYWORDS .
SOURCE western European house mouse.
ORGANISM Mus musculus domesticus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia; Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are potentially functional
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Direct Submission
JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5, France
FEATURES Location/Qualifiers
source 1..649
/organism="Mus musculus domesticus"
/sub_species="domesticus"
/db_xref="taxon:10092"
/clone="OR11M"
mRNA <1..>649
/product="olfactory receptor"
CDS <1..>649
/note="region between transmembrane domains TM2 and TM7."
/codon_start=2
/product="olfactory receptor"
/translation="FSDLCFSSVTMPKLLQNMQSQDPSIPYGGCLAQIFFFMLFGDME
SFLLVAMAYDRYVAICFPLHYTSIMSPKVCTFLVLLLWILTTPHATMQILLTVRLSFC
ENNVFLNFFCDIFVLLKLACSDTYVNDLMILIMGGLIIVIPFLLIVISYARIISSTLK
VPSTQGIHKVFSTCGSHLSVVSLFYGTIIGLYLCPSGNNFSLKGSAMAMMYTVVTP" (SEQ ID NO:377).
BASE COUNT 143 a 160 c 122 g 224 t
ORIGIN
1 tttctctgac ctctgctttt cctctgtcac aatgcccaaa ttgctgcaga atatgcagag
61 ccaggaccca tccatcccct atggaggttg cctggcacaa atattcttct ttatgctttt
121 tggagacatg gaaagcttcc ttcttgtagc catggcctat gaccgctatg tggccatctg
181 cttccctctg cattacacta gcatcatgag tcctaaggtc tgtacttttc tagtgctact
241 gttgtggata ctgacaacac cacatgccac aatgcaaatt ctgctcacag taagactgtc
301 tttttgtgag aacaatgtgt ttctcaactt tttctgtgac atatttgttc tcttaaagct
361 ggcctgctca gacacttatg ttaatgattt gatgatactt atcatgggag ggctcatcat
421 tgttattcca ttcctgctca ttgttatatc ctatgcaagg atcatctcct ctactcttaa
481 ggttccatct actcaaggca tccacaaggt cttctctacc tgtggctctc atctgtctgt
541 ggtgtctctg ttctatggga caattattgg tctctactta tgtccatcag gtaataattt
601 cagtctaaag gggtctgcca tggctatgat gtacacagtg gtgactccc (SEQ ID NO:376).

OR227

LOCUS AF073963 649 bp DNA ROD 12-JUL-1999
DEFINITION Mus musculus domesticus clone OR12M olfactory receptor gene, partial cds.
ACCESSION AF073963
KEYWORDS .
SOURCE western European house mouse.
ORGANISM Mus musculus domesticus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia; Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are potentially functional
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Direct Submission
JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5, France
FEATURES Location/Qualifiers
source 1..649
/organism="Mus musculus domesticus"
/sub_species="domesticus"
/db_xref="taxon:10092"
/clone="OR12M"
mRNA <1..>649
/product="olfactory receptor"
CDS <1..>649
/note="region between transmembrane domains TM2 and TM7."
/codon_start=2
/product="olfactory receptor"
/translation="FSDLCFSSVTMPKLLQNMQSQDTSISYAGCLTQMYFLLVFGDLE
SILLLVMAYDRYVAVCFPLHYMSIMSPTLCVCLLVLSWVFTVLYSMLHTLLLSRLSFC
EDNLIHHFFCDISALLKLACSDIHINELMIFIMGGLVSIIPFLLIVVSYIQIVYSILK
ISSAHVLHKIFSTCGSHLSVVSLFYGTIFALYLCPSANNSTVKEISMAMMCTVVTP" (SEQ ID NO:379).
BASE COUNT 134 a 159 c 122 g 234 t
ORIGIN
1 cttctctgat ctctgctttt cctctgtcac aatgcccaag ttgctacaga acatgcagag
61 ccaggacacg tccatctcct atgctggctg tctgacacaa atgtactttt tattggtttt
121 tggagacctg gagagcatcc ttcttttggt catggcttat gaccggtatg tggctgtctg
181 cttccccctt cattacatga gcatcatgag ccccacactc tgtgtgtgtc tgctagtgtt
241 atcctgggta tttactgtgc tgtattctat gttgcacact ctactcttgt ctagattgtc
301 attctgtgag gataacttga tccaccactt tttctgtgac atatctgccc tgctcaagtt
361 ggcttgctct gacattcata ttaatgaatt aatgatattt atcatgggag ggcttgttag
421 catcatccca ttcttactca ttgttgtgtc ctatatacaa attgtctact ccattctaaa
481 gatttcatct gctcatgttt tacacaagat cttctccacc tgtgggtccc acctgtctgt
541 agtctcactg ttctatggga caatttttgc tctctactta tgtccatcag ctaataactc
601 tactgtgaag gagatttcca tggccatgat gtgcacagtg gtgactccc (SEQ ID NO:378).

OR228

LOCUS AF073964 649 bp DNA ROD 12-JUL-1999
DEFINITION Mus musculus domesticus clone OR15-71M19 olfactory receptor gene, partial cds.
ACCESSION AF073964
KEYWORDS .
SOURCE western European house mouse.
ORGANISM Mus musculus domesticus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia; Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are potentially functional
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Direct Submission
JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5, France
FEATURES Location/Qualifiers
source 1..649
/organism="Mus musculus domesticus"
/sub_species="domesticus"
/db_xref="taxon:10092"
/clone="OR15-71M19"
mRNA <1..>649
/product="olfactory receptor"
CDS <1..>649
/note="region between transmembrane domains TM2 and TM7."
/codon_start=2
/product="olfactory receptor"
/translation="FSDIGFISTTIPKMLVNIQTQSKSISYAECITQIYFFMLFGGMD
ILLLTVMAYDRFVAICHPLHYSVIMNPQLSGLLVLVSWFISFSYSLIQSLLMLRLSFC
TNQIIKHFYCEYSRALTIACSDTLINHILLYILICVLGFIPFSGILYSYCKIVSSILR
IPSTDGKYKAFSTCGSHLSVVSLFYGTGLGVYLSSDVTSSSGKDVVASVMYTVVTP" (SEQ ID NO:381).
BASE COUNT 153 a 151 c 112 g 233 t
ORIGIN
1 cttttctgac attggtttca tctctacaac tatccctaag atgttggtga atatccaaac
61 acagagcaag tccatctcct atgcagaatg catcacccag atttattttt tcatgctctt
121 tggaggcatg gacatacttc tcctcaccgt gatggcctat gaccgatttg tggccatctg
181 tcacccccct cactattcag tcattatgaa tccccaacta agtggcttgc tggttcttgt
241 atcatggttt attagctttt catattctct gatacagagt ctattgatgc tgcggttgtc
301 cttctgtaca aatcagataa ttaaacactt ttactgtgaa tattctagag ccctcactat
361 agcctgctca gacacactaa tcaatcatat ccttctttat attctgatat gtgtccttgg
421 cttcatccct ttctcaggga tcctttattc atactgtaaa attgtttctt ctattttgag
481 aattccatca acagatggaa aatataaagc attttctacc tgtgggtctc atctatcagt
541 ggtttcttta ttctatggga caggccttgg tgtgtacctt agttctgatg taacttcctc
601 ctctgggaag gacgtggtgg cctcagtaat gtatacagtg gtcacccct (SEQ ID NO:380).

OR229

LOCUS AF073965 643 bp DNA ROD 12-JUL-1999
DEFINITION Mus musculus domesticus clone OR15-71M20 olfactory receptor gene, partial cds.
ACCESSION AF073965
KEYWORDS .
SOURCE western European house mouse.
ORGANISM Mus musculus domesticus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia; Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.
REFERENCE 1 (bases 1 to 643)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are potentially functional
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 643)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Direct Submission
JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5, France
FEATURES Location/Qualifiers
source 1..643
/organism="Mus musculus domesticus"
/sub_species="domesticus"
/db_xref="taxon:10092"
/clone="OR15-71M20"
mRNA <1..>643
/product="olfactory receptor"
CDS <1..>643
/note="region between transmembrane domains TM2 and TM7."
/codon_start=2
/product="olfactory receptor"
/translation="FVDLCFSSVTVPKLLKDLLSAKKTISIEGCLAQVFFVFFPSGTE
ACLLSVMAYDRYAAICHPLLYGQVMRNELCVRLVVISWGVASLNATIIVLLAVNLDFC
GAQTIHHYTCELPALFPLSCSDISITVVVLLCSSLLHGLGTFIPIFFSYARIVSAILS
ISSTTGRSKAFSTCSSHLAAVTLFFGSGFLCYLMPPSGSSLDLLLSLQYSAVTP" (SEQ ID NO:383).
BASE COUNT 98 a 203 c 142 g 200 t
ORIGIN
1 gttcgtagat ctctgcttct catccgtcac ggtaccgaaa ctgctgaagg acctcctatc
61 ggcgaagaaa accatctcaa tagaaggctg cctggctcag gtctttttg tgttttttcc
121 ttctggtact gaagcctgcc tgctctctgt catggcttat gaccgctatg ctgccatctg
181 ccatcccctg ctctacggcc aggtgatgag aaatgagttg tgtgtaaggc ttgtggtcat
241 ctcatggggc gtggcctctc tcaacgcaac catcatcgtg ctcttggctg tcaacctgga
301 cttctgtggg gctcaaacca ttcaccacta cacctgtgag ctgcctgccc ttttcccctt
361 gtcctgttcc gatatctcca tcactgtcgt cgtcctgctt tgctccagct tgctgcatgg
421 gctgggaacc tttatcccta tcttcttctc ctatgcccgc attgtctccg ccatcttgag
481 catcagttcc accaccggga ggagcaaggc cttctccacc tgctcttccc acctcgctgc
541 agtgaccttg ttctttgggt ctggctttct ttgctatctc atgccgcctt ctggttcttc
601 tctggacttg ctcttgtcgt tgcagtacag cgcagtcacg ccc (SEQ ID NO:382).

OR230

LOCUS AF073966 643 bp DNA ROD 12-JUL-1999
DEFINITION Mus musculus domesticus clone OR15-71M21 olfactory receptor gene, partial cds.
ACCESSION AF073966
KEYWORDS .
SOURCE western European house mouse.
ORGANISM Mus musculus domesticus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia; Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.
REFERENCE 1 (bases 1 to 643)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are potentially functional
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 643)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Direct Submission
JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5, France
FEATURES Location/Qualifiers
source 1..643
/organism="Mus musculus domesticus"
/sub_species="domesticus"
/db_xref="taxon:10092"
/clone="OR15-71M21"
mRNA <1..>643
/product="olfactory receptor"
CDS <1..>643
/note="region between transmembrane domains TM2 and TM7."
/codon_start=2
/product="olfactory receptor"
/translation="LVDIFFSSVTIPKMLANHLLGSKAISFGGCMAQMYFMISLGNTD
SYILAAMAYDRAVAISRPLHYATIMSPQLCVLLVAGSWVIANANALPHTLLTARLSFC
GNKDVANFYCDITPLLQLSCSDIRFNVKMMYLGVGVFSVPLLCIIISYVRVFSTVLRV
PSTKGFLKALSTCGSHLTVVSLYYGTVMGMYFRPLTSYSLKHALITVMYTAVTP" (SEQ ID NO:385).
BASE COUNT 133 a 171 c 148 g 191 t
ORIGIN
1 ccttgttgac atcttcttct cctctgtaac tattcccaag atgctggcca accatctcct
61 aggtagcaag gccatctcct ttgggggatg tatggcacag atgtacttca tgatatcatt
121 gggaaacaca gacagttata tactagctgc aatggcatat gaccgagctg tggctatcag
181 tcgcccgctt cattatgcaa caattatgag tccacaactt tgtgtcctgc tggttgctgg
241 gtcctgggtg attgcaaatg ctaatgcact gccccacacc ctactcacag ctagattgtc
301 cttctgtggc aataaggatg tggccaactt ctactgtgac attacacctt tgctccagct
361 gtcctgttct gacatccgct tcaatgtgaa gatgatgtac cttggggtgg gggtcttctc
421 tgtgccactg ctgtgcatca tcatctccta tgtccgggtc ttttccacag tcttgcgggt
481 tccatctacc aagggcttcc tgaaggcctt gtccacctgt ggctctcacc tgacagtggt
541 gtccttgtat tatgggacag tcatgggcat gtatttccgg cccctgacca gttacagtct
601 gaagcatgca ttgataactg tgatgtacac ggcagtgacc cca (SEQ ID NO:384).

OR231

LOCUS AF073967 649 bp DNA ROD 12-JUL-1999
DEFINITION Mus musculus domesticus clone OR15-71M24 olfactory receptor gene, partial cds.
ACCESSION AF073967
KEYWORDS .
SOURCE western European house mouse.
ORGANISM Mus musculus domesticus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia; Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are potentially functional
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Direct Submission
JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5, France
FEATURES Location/Qualifiers
source 1..649
/organism="Mus musculus domesticus"
/sub_species="domesticus"
/db_xref="taxon:10092"
/clone="OR15-71M24"
mRNA <1..>649
/product="olfactory receptor"
CDS <1..>649
/note="region between transmembrane domains TM2 and TM7."
/codon_start=2
/product="olfactory receptor"
/translation="LVDICFTTVIVPQMLVNLLTQRKTILFAQCLTQMYFFVAFGITD
SFLLAAMAIDRYVAICNPLHYNTVMSPRRCRLLVVASWAVSHLHSLTHTILMGRLSFC
GPNVIHHFFCDVQPLLTLSCSDTSINELLAFTEGSVVIMSPFILLLSLISIFTRTVLR
VPSGEGRYKVFSTCGSHLTVVALFYGTIISVYIRPSSTYSVTKDRVVTVIYTVVTP" (SEQ ID NO:387).
BASE COUNT 134 a 180 c 128 g 207 t
ORIGIN
1 cctggtggac atctgcttta ccactgtcat cgtgccacag atgttagtga acttgctgac
61 acagagaaag acaatcctct ttgcccagtg cctcactcaa atgtatttct ttgtggcttt
121 tggtattaca gacagtttcc ttttggctgc gatggccatt gaccgctatg ttgctatttg
181 caatccgctt cattacaaca cagtcatgag tcccaggcgc tgtcgcttgc tggttgtggc
241 atcctgggca gtgtcccatc ttcactccct cacccacaca attctcatgg gtcgcctctc
301 tttctgtgga cccaatgtca ttcatcactt cttttgtgat gtccagccac tgctgacact
361 ctcctgctct gacacctcta tcaatgagct cttggccttc acagagggct ctgttgtaat
421 catgagccct tttatcttat tgttgtctct tatatctata ttcactcgga ctgttctgag
481 ggtcccttca ggggaaggaa ggtacaaagt tttctctacc tgtgggtctc acctcacagt
541 tgtagcactg ttctatggaa ccataatatc agtgtacatt cgcccctcat ccacctactc
601 agtgacaaag gaccgagttg tcactgtcat ctatacagta gttacccca (SEQ ID NO:386).

OR232

LOCUS AF073968 649 bp DNA ROD 12-JUL-1999
DEFINITION Mus musculus domesticus clone OR18M olfactory receptor gene, partial cds.
ACCESSION AF073968
KEYWORDS .
SOURCE western European house mouse.
ORGANISM Mus musculus domesticus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia; Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are potentially functional
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Direct Submission
JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5, France
FEATURES Location/Qualifiers
source 1..649
/organism="Mus musculus domesticus"
/sub_species="domesticus"
/db_xref="taxon:10092"
/clone="OR18M"
mRNA <1..>649
/product="olfactory receptor"
CDS <1..>649
/note="region between transmembrane domains TM2 and TM7."
/codon_start=2
/product="olfactory receptor"
/translation="FSDLCFSSVTMPKLLQNMQIQDTPISYVACLTQMYFFSVFGSLE
IFLLVVLAYDRYVAICLPLQYSSIMSPNLCVCVVVFCWVFIVFYAMFHTLLLARLSFC
KNNVIPHFFCDISALLKLACSDVYINELMILILGGFLLVISLLLIIVSYVQIVSSILR
ISSTRAIHKLFSTCGSHLSVVSLFYGTIIGLYLCPSANNSTEKETAMSLMYTVVTP" (SEQ ID NO:389).
BASE COUNT 136 a 155 c 121 g 237 t
ORIGIN
1 cttctctgat ctctgctttt cctctgtcac aatgcccaag ttgctgcaga acatgcagat
61 ccaggacaca cccatatcct atgtggcttg tctgacacaa atgtactttt tcagtgtttt
121 tggaagtctg gagatattcc ttcttgtagt cctggcctat gaccgctatg tggccatctg
181 tttacccctt caatattcca gcatcatgag ccccaatctc tgtgtgtgtg tggtggtgtt
241 ctgctgggta tttattgtgt tttatgccat gtttcacaca ctactcttgg ctagattgtc
301 attttgtaag aacaatgtga tcccacactt tttctgtgac atatctgccc ttctgaagtt
361 ggcatgctct gatgtttata ttaatgaatt aatgatactt atcttgggag ggtttcttct
421 tgtcatctca ctcttactca tcattgtatc ctatgtacaa attgtctcct caattttaag
481 gatttcttct actcgggcta tccataagct cttctccacc tgtggctcac acctgtctgt
541 ggtctcactg ttctatggga caattattgg tctgtactta tgtccatcag ctaataactc
601 tactgaaaag gagactgcca tgtccctgat gtacacagtg gtgactccc (SEQ ID NO:388).

OR233

LOCUS AF073969 649 bp DNA ROD 12-JUL-1999
DEFINITION Mus musculus domesticus clone OR1M olfactory receptor gene, partial cds.
ACCESSION AF073969
KEYWORDS .
SOURCE western European house mouse.
ORGANISM Mus musculus domesticus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia; Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are potentially functional
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Direct Submission
JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5, France
FEATURES Location/Qualifiers
source 1..649
/organism="Mus musculus domesticus"
/sub_species="domesticus"
/db_xref="taxon:10092"
/clone="OR1M"
mRNA <1..>649
/product="olfactory receptor"
CDS <1..>649
/note="region between transmembrane domains TM2 and TM7."
/codon_start=2
/product="olfactory receptor"
/translation="FSDLCFSSVTMPKLLQNIQSQDPSIPYAGCLAQTYFFMVFGDME
SFLLVAMAYDRYVAICFPLHYTSIMSPKLCGCLMLLLWMLTTSHAMMHTLLAARLSFC
ENNVILNFFCDLFVLLKLACSDTYVNELMIFIMSSLLIVIPFFLIVMSYARIIASILK
VPSIQGIYKVFSTCGSHLSVVTLFYGTIIGLYLCPSGNNSTVKGTVMAMMYTVVTP" (SEQ ID NO:391).
BASE COUNT 142 a 161 c 123 g 223 t
ORIGIN
1 cttctctgat ctctgctttt cctctgtcac aatgcccaaa ttgctgcaga atatacagag
61 ccaggaccca tccatcccct atgcaggctg cctggcacaa acatacttct ttatggtttt
121 tggagatatg gagagcttcc ttcttgtggc catggcctat gaccgctatg tggccatctg
181 cttccctctg cattacacca gcatcatgag tcccaaactc tgtggttgtc taatgctgct
241 attgtggatg ctaacaacat cccatgccat gatgcatact ctccttgcag caagattgtc
301 tttttgtgag aacaatgtga tcctcaattt tttctgtgac ctatttgttc tcctaaagct
361 ggcttgctca gacacttatg ttaatgagtt gatgatattt ataatgagtt ccctcctcat
421 tgttattcca tttttcctca ttgtcatgtc ttatgcaagg atcattgcct ccattcttaa
481 ggttccatct attcaaggga tctacaaggt cttctccacc tgtggttccc atctgtctgt
541 ggtgaccttg ttttatggga caattattgg tctctactta tgtccatcag gtaataattc
601 cacagtaaag gggactgtca tggccatgat gtacacagtg gtgactccc (SEQ ID NO:390).

OR234

LOCUS AF073970 649 bp DNA ROD 12-JUL-1999
DEFINITION Mus musculus domesticus clone OR21M olfactory receptor gene, partial cds.
ACCESSION AF073970
KEYWORDS .
SOURCE western European house mouse.
ORGANISM Mus musculus domesticus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia; Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are potentially functional
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Direct Submission
JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5, France
FEATURES Location/Qualifiers
source 1..649
/organism="Mus musculus domesticus"
/sub_species="domesticus"
/db_xref="taxon:10092"
/clone="OR21M"
mRNA <1..>649
/product="olfactory receptor"
CDS <1..>649
/note="region between transmembrane domains TM2 and TM7."
/codon_start=2
/product="olfactory receptor"
/translation="FADICFTSASIPKMLVNIQTKNKVITYEGCISQVFFFILFGVLD
NFLLAVMAYDRYVAICHPLHYMVIMNRRLCGFLVLGSWVTTALNSLLQSSMALRLSFC
TDLKIPHFVCELNQLVLLACNDTFPNDMVMYFAAILLGGGPLAGILYSYSKIVSSIRA
ISSSQGKYKASSTCASHLSVVSLFYSTLLGAYLSSSFTQNSHSTARASVMYSVVTP" (SEQ ID NO:393).
BASE COUNT 150 a 156 c 122 g 221 t
ORIGIN
1 ctttgcagac atctgcttta cttctgctag catcccaaag atgctagtga atatacagac
61 aaagaacaag gtgataacct atgaaggttg catttctcaa gtattctttt tcatactatt
121 tggagtttta gataactttc ttctagctgt gatggcctat gaccgatatg tggcaatctg
181 tcaccctctg cactatatgg tcatcatgaa ccgccgcctc tgtggatttt tagttttggg
241 gtcttgggtc acaacagcat tgaattcctt gctgcagagt tcaatggcac tgcggctgtc
301 cttttgtaca gacttgaaaa ttccccactt tgtttgtgag cttaatcaac tggtactact
361 tgcctgtaat gacacctttc ctaatgacat ggtgatgtac tttgcagcta tactgctggg
421 tggtggtcct cttgctggca tcctttactc ttattctaag atagtttcct ccatacgtgc
481 aatctcatca tcacagggga agtataaagc atcctccacc tgtgcatccc acctctcagt
541 tgtttcatta ttctattcta cactcttggg tgcgtatctt agttcttctt ttacacaaaa
601 ctcacactca actgcacgag catctgttat gtacagtgtg gtcacccccc (SEQ ID NO:392).

OR235

LOCUS AF073971 649 bp DNA ROD 12-JUL-1999
DEFINITION Mus musculus domesticus clone OR22M olfactory receptor gene, partial cds.
ACCESSION AF073971
KEYWORDS .
SOURCE western European house mouse.
ORGANISM Mus musculus domesticus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia; Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are potentially functional
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Direct Submission
JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5, France
FEATURES Location/Qualifiers
source 1..649
/organism="Mus musculus domesticus"
/sub_species="domesticus"
/db_xref="taxon:10092"
/clone="OR22M"
mRNA <1..>649
/product="olfactory receptor"
CDS <1..>649
/note="region between transmembrane domains TM2 and TM7."
/codon_start=2
/product="olfactory receptor"
/translation="FSDLCFSSVTMPKLLQNMQSQDSSITYAGCLTQMYFFLLFGDLE
SFLLVAMAYDRYVAICFPLHYMSIMSPSLCVSLVLLSWVLTTFHAMLHTLLMARLSFC
EDNVIPYFFCDMSALLKLSCSDTHVNELVIFVTGGLILVIPFVLILVSYARIVSSILK
VPSARGIRKAFSTCGSHLSVVSLFYGTIIGLYLCPSADNSTVKETVMAMMYTVVTP" (SEQ ID NO:395).
BASE COUNT 121 a 184 c 140 g 204 t
ORIGIN
1 cttctctgat ctctgctttt cctctgtcac aatgcccaaa ttgctgcaga acatgcagag
61 ccaggactca tccatcacct atgcaggatg cctgacacaa atgtactttt tcttgctctt
121 tggagacctt gagagcttcc tccttgtggc catggcctat gaccgctatg tggccatctg
181 cttccccctt cattacatga gcatcatgag ccccagcctc tgtgtgagtc tggtgctgct
241 gtcctgggtg ctgaccactt tccatgccat gctgcatacc ctgctcatgg ccagattgtc
301 attctgtgag gacaatgtga tcccctactt tttctgtgac atgtctgctc tgctgaagct
361 gtcctgctct gacactcacg ttaatgaatt ggtgatattt gtcacaggag gcctgatcct
421 tgtcattcca tttgtgctca tccttgtgtc ctatgcacga attgtgtcct ccattctcaa
481 ggtcccgtct gctcgaggca tccgtaaagc cttctccacc tgtgggtccc acctgtctgt
541 ggtgtcactg ttctatggga caatcattgg tctgtactta tgtccatcag ctgataactc
601 tactgtgaag gaaactgtca tggccatgat gtacacagtg gtgactccc (SEQ ID NO:394).

OR236

LOCUS AF073972 649 bp DNA ROD 12-JUL-1999
DEFINITION Mus musculus domesticus clone OR25M olfactory receptor gene, partial cds.
ACCESSION AF073972
KEYWORDS .
SOURCE western European house mouse.
ORGANISM Mus musculus domesticus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia; Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are potentially functional
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Direct Submission
JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5, France
FEATURES Location/Qualifiers
source 1..649
/organism="Mus musculus domesticus"
/sub_species="domesticus"
/db_xref="taxon:10092"
/clone="OR25M"
mRNA <1..>649
/product="olfactory receptor"
CDS <1..>649
/note="region between transmembrane domains TM2 and TM7."
/codon_start=2
/product="olfactory receptor"
/translation="FTDLCFSTVTMPNFLQNMQSQVSSIPYAGCLAQMYFFLFFGDVE
SLLLVAMAYDRYVAICFPLHYTRIMSPNLCVSMVLLSWALTTLYAMLHTLLLTRLSFC
KNNVIPHFFCDLSALLKLACSDIHINELMIMIIGALVVILPFLLIIVSYAHIVSSILK
VPSTRGIHKVFSTCGSHLSVVSLFYGSVIVLYLCPSSNNSTVKDTVMSMMYTVVIP" (SEQ ID NO:397).
BASE COUNT 136 a 163 c 118 g 232 t
ORIGIN
1 cttcactgac ctctgctttt ctactgtcac aatgcccaat ttcctgcaaa acatgcagag
61 ccaagtatca tccattccct atgcaggctg ccttgcacaa atgtacttct ttttgttttt
121 cggtgatgtt gagagtttac tccttgttgc catggcctat gaccgttatg tggccatctg
181 cttccctctt cattatacca gaatcatgag cccaaacctc tgtgtgagta tggtgctgct
241 gtcctgggca ctgacaacat tgtatgccat gttgcacact ttgctcttaa ctaggttgtc
301 tttctgtaaa aacaatgtga tcccccattt tttctgtgac ctttctgctc tcctgaagct
361 ggcctgctct gatattcaca ttaatgagtt aatgataatg ataattggag cacttgttgt
421 tatacttcca tttctactca tcatagtgtc ttatgcgcac attgtctcct ccattctcaa
481 agtcccttca actcgaggca tccacaaggt cttctccact tgtgggtctc atctgtctgt
541 ggtgtcactg ttctatgggt cagtcattgt tctgtactta tgtccatcat ctaataactc
601 tactgtgaag gatactgtca tgtctatgat gtacactgtg gtgattccc (SEQ ID NO:396).

OR237

LOCUS AF073973 649 bp DNA ROD 12-JUL-1999
DEFINITION Mus musculus domesticus clone OR27M olfactory receptor gene, partial cds.
ACCESSION AF073973
KEYWORDS .
SOURCE western European house mouse.
ORGANISM Mus musculus domesticus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia; Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are potentially functional
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Direct Submission
JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5, France
FEATURES Location/Qualifiers
source 1..649
/organism="Mus musculus domesticus"
/sub_species="domesticus"
/db_xref="taxon:10092"
/clone="OR27M"
mRNA <1..>649
/product="olfactory receptor"
CDS <1..>649
/note="region between transmembrane domains TM2 and TM7."
/codon_start=2
/product="olfactory receptor"
/translation="FTDLCFSTVTMPNFLQNMQSQVSSIPYAGCLAQMYFFLFFGDVE
SLLLVAMAYDRYVAICSPLHYTRIMSPNLCVSMVLLSWALTTLYAMLHTLLLTRLSFC
KNNVIPHFFCDLSALLKLACSDIHINELMIMIIGALVVILPFLLIIVSYAHIVSSTLK
VPSTRGIHKVFSTCGSHLSVVSLFYGSVIVLYLCPSSNNSTVKDTVMSMMYTVVTP" (SEQ ID NO:399).
BASE COUNT 136 a 165 c 117 g 231 t
ORIGIN
1 cttcactgac ctctgctttt ctactgtcac aatgcccaat ttcctgcaaa acatgcagag
61 ccaagtatca tccattccct atgcaggctg ccttgcacaa atgtacttct ttttgttttt
121 tggtgatgtt gagagtttac tccttgttgc catggcctat gaccgttatg tggccatctg
181 ctcccctctt cattatacca gaatcatgag cccaaacctc tgtgtgagta tggtgctgct
241 gtcctgggca ctgacaacat tgtatgccat gttgcacact ttgctcttaa ctaggttgtc
301 tttctgtaaa aacaatgtga tccccccattt tttctgtgac ctttctgctc tcctgaagct
361 ggcctgctct gatattcaca ttaatgagtt aatgataatg ataattggag cacttgttgt
421 tatacttcca tttctactca tcatagtgtc ttatgcgcac attgtctcct ccactctcaa
481 agtcccttca actcgaggca tccacaaggt cttctccact tgtggttctc atctgtctgt
541 ggtgtcactg ttctatgggt cagtcattgt tctgtactta tgtccatcat ctaataactc
601 tactgtgaag gatactgtca tgtctatgat gtacactgtg gtgactccc (SEQ ID NO:398).

OR238

LOCUS AF073974 649 bp DNA ROD 12-JUL-1999
DEFINITION Mus musculus domesticus clone OR28M olfactory receptor gene, partial cds.
ACCESSION AF073974
KEYWORDS .
SOURCE western European house mouse.
ORGANISM Mus musculus domesticus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia; Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are potentially functional
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Direct Submission
JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5, France
FEATURES Location/Qualifiers
source 1..649
/organism="Mus musculus domesticus"
/sub_species="domesticus"
/db_xref="taxon:10092"
/clone="OR28M"
mRNA <1..>649
/product="olfactory receptor"
CDS <1..>649
/note="region between transmembrane domains TM2 and TM7."
/codon_start=2
/product="olfactory receptor"
/translation="VVDICYTSSGVPQMLAHFLMEKKTISFALCGTQLFFALTLGGTE
FLLLTAMAYDRYVAVCNPLRYTVVMNPRLCMGLAGVSWFVGVVNSAVETAVTMYLPTC
GHNVLNHVACETLALVRLACVDITLNQVVILASSVVVLMIPCSLVSLSYAHIVAAIMK
IRSTQGRRKAFETCASHLTVVSMSYGMALFTYLQPASTASAEQDKVVVIFYALVTP" (SEQ ID NO:401).
BASE COUNT 119 a 183 c 166 g 181 t
ORIGIN
1 agtggtggac atctgctaca cctccagtgg ggtcccccag atgctggcac acttcctcat
61 ggagaaaaag accatctctt ttgccctatg tgggacccag ctcttctttg ctctgactct
121 tgggggaact gagtttctgt tgctgactgc catggcctat gaccgctatg tggctgtctg
181 taatccatta cggtacacag tggtgatgaa cccaaggctc tgcatgggtc tagcaggtgt
241 ctcttggttt gtgggtgtag ttaattctgc tgtggagaca gcagtcacca tgtaccttcc
301 cacctgtggg cacaatgtac tcaaccatgt ggcctgtgag acactggcac tggtcagact
361 ggcctgtgtg gacatcaccc tcaaccaagt ggtgatactg gcttctagtg tggtggtgct
421 gatgataccc tgctctctgg tctctctgtc ctatgcccac attgtagctg ccatcatgaa
481 gatccgttct acccagggac gccgcaaagc ctttgagacc tgtgcctccc atctgactgt
541 ggtctccatg tcttatggga tggccctctt cacctacctg cagcctgcct ccacagcctc
601 tgctgagcag gacaaggtgg tagtgatctt ctatgctttg gtcaccccc (SEQ ID NO:400).

OR239

LOCUS AF073975 649 bp DNA ROD 12-JUL-1999
DEFINITION Mus musculus domesticus clone OR29M olfactory receptor gene, partial cds.
ACCESSION AF073975
KEYWORDS .
SOURCE western European house mouse.
ORGANISM Mus musculus domesticus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia; Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are potentially functional
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Direct Submission
JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5, France
FEATURES Location/Qualifiers
source 1..649
/organism="Mus musculus domesticus"
/sub_species="domesticus"
/db_xref="taxon:10092"
/clone="OR29M"
mRNA <1..>649
/product="olfactory receptor"
CDS <1..>649
/note="region between transmembrane domains TM2 and TM7."
/codon_start=2
/product="olfactory receptor"
/translation="FVDLCQSSVIMPKMLEKFVMVKSVISFAECMAQFYLFDVFAVSE
CHMLAVMAYDRYVAICNPLLYNVTMSYKVCSWMVVGVYSVGLICATGETVCLLRLLFC
KADDINHYFCDLLPLLEQSCSNTFINEILGLSFSSFNTTVPALTILSSYIFIIASILR
IPSTEGRSKAFSTCSSHILAVAVFFGSLAFMYLQPSSVSSMDQGKVSSVFYTIVVP" (SEQ ID NO:403).
BASE COUNT 143 a 159 c 130 g 217 t
ORIGIN
1 tttcgttgac ctctgccagt ccagtgtcat catgcccaaa atgctggaga aatttgtcat
61 ggtgaagagt gtcatttctt ttgcagaatg catggctcag ttttacttat ttgatgtttt
121 tgctgtttca gagtgtcaca tgctggctgt catggcttat gatcgctatg ttgccatctg
181 taacccctg ctatataatg ttaccatgtc ttacaaagtg tgttcctgga tggtagtggg
241 ggtgtatagt gtaggcttga tttgtgccac aggggaaaca gtctgcctgc ttagactgct
301 attctgcaaa gctgatgaca taaaccacta cttctgtgat cttttaccac tactggaaca
361 atcctgttcc aatacattta tcaatgaaat actaggactg tccttcagtt catttaatac
421 tactgtccca gctctgacca tcctcagttc ctacatcttc atcatagcca gcatcctccg
481 cattccttcc actgaaggca ggtccaaagc cttcagcacc tgcagctccc acatcttggc
541 tgttgctgtc ttctttgggt ctttagcatt catgtacctt cagccatcat cagtcagctc
601 catggaccaa gggaaagtgt cctctgtgtt ttataccatt gttgtgccc (SEQ ID NO:402).

OR240

LOCUS AF073976 649 bp DNA ROD 12-JUL-1999
DEFINITION Mus musculus domesticus clone OR2M olfactory receptor gene, partial cds.
ACCESSION AF073976
KEYWORDS .
SOURCE western European house mouse.
ORGANISM Mus musculus domesticus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia; Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are potentially functional
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Direct Submission
JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5, France
FEATURES Location/Qualifiers
source 1..649
/organism="Mus musculus domesticus"
/sub_species="domesticus"
/db_xref="taxon:10092"
/clone="OR2M"
mRNA <1..>649
/product="olfactory receptor"
CDS <1..>649
/note="region between transmembrane domains TM2 and TM7."
/codon_start=2
/product="olfactory receptor"
/translation="FTDLCFSSVTMPKLLQNMQSQVPSIPYAGCLTQMYFFLFFGDLE
SFLLVAMAYDRYVAICFPLHYTSIMSPRLCVSLVLLSWLLTMSHSMLHTLLLTRLSFC
ENNVIPHFFCDLSALLKLACSDIHINELVILIIGGLVVILPFLLVTVSYARIISSILK
VPSTRGIHKVFSTCGSHLSVVSLFYGTIIGLYLCPSANNSTLKDTVMSLMYTVVTP" (SEQ ID NO:405).
BASE COUNT 126 a 177 c 123 g 223 t
ORIGIN
1 cttcactgac ctctgctttt cctctgtcac aatgcccaag ttgctgcaga acatgcagag
61 ccaagttcct tcaatcccct atgcaggctg cctgacacaa atgtacttct ttttgttttt
121 tggagatctt gagagcttcc tccttgtggc catggcctat gaccgatatg tagccatctg
181 cttccctctt cattacacca gcattatgag ccccaggctc tgtgtgagtc ttgtgctgct
241 gtcctggttg ctgaccatgt cccattccat gctgcacact ttgctcttaa ctaggttgtc
301 tttctgtgaa aacaatgtga tcccccattt tttctgtgat ctgtctgctc tgctgaagct
361 ggcctgctct gatattcaca ttaatgaatt ggtgatattg atcataggag ggcttgttgt
421 tatacttcca tttctactcg tcacagtgtc ttatgcacgc atcatctcct ccattctcaa
481 ggtcccttca actcgaggca tccacaaggt cttctccact tgtggttctc acctgtctgt
541 ggtgtcactg ttctatggga caattattgg cctctactta tgtccatctg ctaataactc
601 tactctaaag gacactgtca tgtctctgat gtacactgtg gtaactccc (SEQ ID NO:404).

OR241

LOCUS AF073977 650 bp DNA ROD 12-JUL-1999
DEFINITION Mus musculus domesticus clone OR3M olfactory receptor gene, partial cds.
ACCESSION AF073977
KEYWORDS .
SOURCE western European house mouse.
ORGANISM Mus musculus domesticus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia; Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.
REFERENCE 1 (bases 1 to 650)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are potentially functional
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 650)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Direct Submission
JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5, France
FEATURES Location/Qualifiers
source 1..650
/organism="Mus musculus domesticus"
/sub_species="domesticus"
/db_xref="taxon:10092"
/clone="OR3M"
mRNA <1..>650
/product="olfactory receptor"
CDS <1..>650
/note="region between transmembrane domains TM2 and TM7."
/codon_start=3
/product="olfactory receptor"
/translation="FSDLCFSSVTMPKLLQNMQIQDTPISYVACLTQMYFFSVFGSLE
IFLLVVLAYDRYVAICLPLQYSSIMSPNLCVCVVVFCWVFIVFYAMFHTLLLARLSFC
KNNVIPHFFCDISALLKLACSDVYINELMILILGGFLLVTSLLLIIVSYVQIVSSILR
ISSTRAIHKLFSTCGSHLSVVSLFYGAIIGLYLCPSANNSTEKETAMSLMYTVVTP" (SEQ ID NO:407).
BASE COUNT 135 a 157 c 122 g 236 t
ORIGIN
1 ccttctctga tctctgcttt tcctctgtca caatgcccaa gttgctgcag aacatgcaga
61 tccaggacac acccatatcc tatgtggctt gtctgacaca aatgtacttt ttcagtgttt
121 ttggaagtct ggagatattc cttcttgtag tcctggccta tgaccgctat gtggccatct
181 gtttacccct tcaatattcc agcatcatga gccccaatct ctgtgtgtgt gtggtggtgt
241 tctgctgggt atttattgtg ttttatgcca tgtttcacac actactcttg gctagattgt
301 cattttgtaa gaacaatgtg atcccacact ttttctgtga catatctgcc cttctgaagt
361 tggcatgctc tgatgtttat attaatgaat taatgatact tatcttggga gggtttcttc
421 ttgtcacctc actcttactc atcattgtat cctatgtaca aattgtctcc tcaattttaa
481 ggatttcttc tactcgggct atccataagc tcttctccac ctgtggctca cacctgtctg
541 tggtctcact gttctatggg gcaattattg gtctgtactt atgtccatca gctaataact
601 ctactgaaaa ggagactgcc atgtccctga tgtacacagt ggtgactccc (SEQ ID NO:406).

OR242

LOCUS AF073978 648 bp DNA ROD 12-JUL-1999
DEFINITION Mus musculus domesticus clone OR4M olfactory receptor gene, partial cds.
ACCESSION AF073978
KEYWORDS .
SOURCE western European house mouse.
ORGANISM Mus musculus domesticus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia; Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.
REFERENCE 1 (bases 1 to 648)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are potentially functional
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 648)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Direct Submission
JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5, France
FEATURES Location/Qualifiers
source 1..648
/organism="Mus musculus domesticus"
/sub_species="domesticus"
/db_xref="taxon:10092"
/clone="OR4M"
mRNA <1..>648
/product="olfactory receptor"
CDS <1..>648
/note="region between transmembrane domains TM2 and TM7."
/codon_start=2
/product="olfactory receptor"
/translation="FSDLCFSSVTMPKLLQNMQIQDTPISYVACLTQMYFFSVFGSLE
IFLLVVLAYDRYVAICLPLQYSSIMSPNLCVCVVVFCWVFIVFYAMFHTLLLARLSFC
KNNVIPHFFCDISALLKLACSDVYINELMILILGGFLLVISLLLIIVSYVQIVSSILR
ISSTRAIHKLFSTCGSHLSVVSLFYGTIIGLYLCPSANNSTEKETAMSLMYTVVTP" (SEQ ID NO:409).
BASE COUNT 135 a 154 c 122 g 237 t
ORIGIN
1 cttctctgat ctctgctttt cctctgtcac aatgcccaag ttgctgcaga acatgcagat
61 ccaggacaca cccatatcct atgtggcttg tctgacacaa atgtactttt tcagtgtttt
121 tgggagtctg gagatattcc ttcttgtagt cctggcctat gaccgctatg tggccatctg
181 tttacccctt caatattcca gcatcatgag ccccaatctc tgtgtgtgtg tggtggtgtt
241 ctgctgggta tttattgtgt tttatgccat gtttcacaca ctactcttgg ctagattgtc
301 attttgtaag aacaatgtga tcccacactt tttctgtgac atatctgccc ttctgaagtt
361 ggcatgctct gatgtttata ttaatgaatt aatgatactt atcttgggag ggtttcttct
421 tgtcatctca ctcttactca tcattgtatc ctatgtacaa attgtctcct caattttaag
481 gatttcttct actcgggcta tccataagct cttctccacc tgtggctcac acctgtctgt
541 ggtctcactg ttctatggga caattattgg tctgtactta tgtccatcag ctaataactc
601 tactgaaaag gagactgcca tgtccctgat gtacacagtg gtgactcc (SEQ ID NO:408).

OR243

LOCUS AF073979 649 bp DNA ROD 12-JUL-1999
DEFINITION Mus musculus domesticus clone OR5M olfactory receptor gene, partial cds.
ACCESSION AF073979
KEYWORDS .
SOURCE western European house mouse.
ORGANISM Mus musculus domesticus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia; Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are potentially functional
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Direct Submission
JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5, France
FEATURES Location/Qualifiers
source 1..649
/organism="Mus musculus domesticus"
/sub_species="domesticus"
/db_xref="taxon:10092"
/clone="OR5M"
mRNA <1..>649
/product="olfactory receptor"
CDS <1..>649
/note="region between transmembrane domains TM2 and TM7."
/codon_start=2
/product="olfactory receptor"
/translation="FSDLCFSSVTMPKLLQNMQSQDPSIPYASCLTQMYFFMAFGNME
IYLLVVMAYDRYVAICFPLHYTSIMSPKLCVSLVVLSWVFTILYSMLHTLLLARLSFC
EDNVIPHFFCDISALLKLACSDISINELMIFIVGGLDTVIPFLLIVVSYVQIVCSILK
FSSTRGIHKVFSTCGSHLSVVSLFYGTIIGVYICPSANNSTVKETVMSLMYTVVTP" (SEQ ID NO:411).
BASE COUNT 135 a 171 c 124 g 219 t
ORIGIN
1 cttctctgat ctctgctttt cctctgtcac aatgcccaag ttgctgcaga acatgcagag
61 ccaggaccca tccatcccct atgccagctg tctgacacaa atgtactttt tcatggcttt
121 tgggaacatg gaaatttatc ttcttgtggt catggcctat gaccgctatg tggccatctg
181 cttccctctt cattacacca gcatcatgag ccctaagctc tgtgtgtctc tggtggttct
241 ctcttgggta tttaccattc tgtattccat gttacacacc ctactcttgg caagattgtc
301 attctgtgag gacaatgtga tcccccactt tttctgtgac atatctgccc tgctcaagtt
361 ggcctgctct gacatttcta ttaatgaact aatgatattt atcgtgggag ggcttgatac
421 tgtaatccca tttttactca ttgttgtttc ctatgtacaa attgtctgct ccattctaaa
481 gttctcatct acacggggca tacacaaggt cttctccacc tgtggctccc acctgtctgt
541 ggtctcactg ttctatggga caattattgg tgtctacata tgcccatcag ctaataactc
601 tactgtgaag gagactgtca tgtccctgat gtacacagtg gtgacgccc (SEQ ID NO:410).

OR244

LOCUS AF073980 649 bp DNA ROD 12-JUL-1999
DEFINITION Mus musculus domesticus clone OR6M olfactory receptor gene, partial cds.
ACCESSION AF073980
KEYWORDS .
SOURCE western European house mouse.
ORGANISM Mus musculus domesticus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia; Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are potentially functional
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Direct Submission
JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5, France
FEATURES Location/Qualifiers
source 1..649
/organism="Mus musculus domesticus"
/sub_species="domesticus"
/db_xref="taxon:10092"
/clone="OR6M"
mRNA <1..>649
/product="olfactory receptor"
CDS <1..>649
/note="region between transmembrane domains TM2 and TM7."
/codon_start=2
/product="olfactory receptor"
/translation="FTDLCFSSVTMPKLLQNMQSQVPSIPYAGCLTQMYFFLFFGDLE
SFLLVAMAYDRYVAICFPLHYTSIMSPRLCVSLVLLSWLLTMSHSMLHTLLLTRLSFC
ENNVIPHFFCDLSALLKLACSDIHINELVILIIGGLVVILPFLLVTVPYARIISSILK
VPSTRGIHKVFSTCGSHLSVVSLFYGTIIGLYLCPSANNSTLKDTVMSLMYTVVTP" (SEQ ID NO:413).
BASE COUNT 126 a 178 c 123 g 222 t
ORIGIN
1 cttcactgac ctctgctttt cctctgtcac aatgcccaag ttgctgcaga acatgcagag
61 ccaagttcct tcaatcccct atgcaggctg cctgacacaa atgtacttct ttttgttttt
121 tggagatctt gagagcttcc tccttgtggc catggcctat gaccgatatg tagccatctg
181 cttccctctt cattacacca gcattatgag ccccaggctc tgtgtgagtc ttgtgctgct
241 gtcctggttg ctgaccatgt cccattccat gctgcacact ttgctcttaa ctaggttgtc
301 tttctgtgaa aacaatgtga tcccccattt tttctgtgat ctgtctgctc tgctgaagct
361 ggcctgctct gatattcaca ttaatgaatt ggtgatattg atcataggag ggcttgttgt
421 tatacttcca tttctactcg tcacagtgcc ttatgcacgc atcatctcct ccattctcaa
481 ggtcccttca actcgaggca tccacaaggt cttctccact tgtggttctc acctgtctgt
541 ggtgtcactg ttctatggga caattattgg cctctactta tgtccatctg ctaataactc
601 tactctaaag gacactgtca tgtctctgat gtacactgtg gtaactccc (SEQ ID NO:412).

OR245

LOCUS AF073981 649 bp DNA ROD 12-JUL-1999
DEFINITION Mus musculus domesticus clone OR7M olfactory receptor gene, partial cds.
ACCESSION AF073981
KEYWORDS .
SOURCE western European house mouse.
ORGANISM Mus musculus domesticus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia; Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are potentially functional
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Direct Submission
JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5, France
FEATURES Location/Qualifiers
source 1..649
/organism="Mus musculus domesticus"
/sub_species="domesticus"
/db_xref="taxon:10092"
/clone="OR7M"
mRNA <1..>649
/product="olfactory receptor"
CDS <1..>649
/note="region between transmembrane domains TM2 and TM7."
/codon_start=2
/product="olfactory receptor"
/translation="FTDLCFSTVTMPNFLQNMQSQVSSIPYAGCLAQMYFFLFFGDVE
SLLLVAMAYDRYVAICFPLHYTRIMSPNLCVSMVLLSWALTTLYAMLHTLLLTRLSFC
KNNVIPHFFCDLSALLKLACSDIHINELMIMIIGALVVILPFLLIIVSYAHIVSSILK
VPSTRGIHKVFSTCGSHLSAVSLFYGSVIVLYLCPSSNNSTVKDTVMSMMYTVVTP" (SEQ ID NO:415).
BASE COUNT 136 a 165 c 117 g 231 t
ORIGIN
1 cttcactgac ctctgctttt ctactgtcac aatgcccaat ttcctgcaaa acatgcagag
61 ccaagtatca tccattccct atgcaggctg ccttgcacaa atgtacttct ttttgttttt
121 tggtgatgtt gagagcttac tccttgttgc catggcctat gaccgttatg tggccatctg
181 cttccctctt cattatacca gaatcatgag cccaaacctc tgtgtgagta tggtgctgct
241 gtcctgggca ctgacaacat tgtatgccat gttgcacact ttgctcttaa ctaggttgtc
301 tttctgtaaa aacaatgtga tcccccattt tttctgtgac ctttctgctc tcctgaagct
361 ggcctgctct gatattcaca ttaatgagtt aatgataatg ataattggag cacttgttgt
421 tatacttcca tttctactca tcatagtgtc ttatgcgcac attgtctcct ccattctcaa
481 agtcccttca actcgaggca tccacaaggt cttctccact tgtggttctc atctgtctgc
541 ggtgtcactg ttctatgggt cagtcattgt tctgtactta tgtccatcat ctaataactc
601 tactgtgaag gatactgtca tgtctatgat gtacactgtg gtgactccc (SEQ ID NO:414)

OR246

LOCUS AF073982 649 bp DNA ROD 12-JUL-1999
DEFINITION Mus musculus domesticus clone OR8M olfactory receptor gene, partial cds.
ACCESSION AF073982
KEYWORDS .
SOURCE western European house mouse.
ORGANISM Mus musculus domesticus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia; Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are potentially functional
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Direct Submission
JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5, France
FEATURES Location/Qualifiers
source 1..649
/organism="Mus musculus domesticus"
/sub_species="domesticus"
/db_xref="taxon:10092"
/clone="OR8M"
mRNA <1..>649
/product="olfactory receptor"
CDS <1..>649
/note="region between transmembrane domains TM2 and TM7."
/codon_start=2
/product="olfactory receptor"
/translation="FSDLCFSSVTMPKLLQNIQSQDPSIPYAGCLAQTYFFMVFGDME
SFLLVAMAYDRYVAICFPLHYTSIMSPKLCGCLMLLLWMLTTSHAMMHTLLAARLSFC
ENNVILNFFCDLFVLLKLACSDTYVNELMIFIMSSLLIVIPFFLIVMSYARIIASILK
VPSIQGIYKVFSTCGSHLSVVTLFYGTIIGLYLCPSGNNSTVKGTVMAMMYTAVTP" (SEQ ID NO:417).
BASE COUNT 143 a 162 c 123 g 221 t
ORIGIN
1 cttctctgat ctctgctttt cctctgtcac aatgcccaaa ttgctgcaga atatacagag
61 ccaggaccca tccatcccct atgcaggctg cctggcacaa acatacttct ttatggtttt
121 tggagatatg gagagcttcc ttcttgtggc catggcctat gaccgctatg tggccatctg
181 cttccctctg cattacacca gcatcatgag tcccaaactc tgtggttgtc taatgctgct
241 attgtggatg ctaacaacat cccatgccat gatgcatact ctccttgcag caagattgtc
301 tttttgtgag aacaatgtga tcctcaattt tttctgtgac ctatttgtac tcctaaagct
361 ggcttgctca gacacttatg ttaatgagtt gatgatattt ataatgagtt ccctcctcat
421 tgttattcca tttttcctca ttgtcatgtc ttatgcaagg atcattgcct ccattcttaa
481 ggttccatct attcaaggga tctacaaggt cttctccacc tgtggttccc atctgtctgt
541 ggtgaccttg ttttatggga caattattgg tctctactta tgtccatcag gtaataattc
601 cacagtaaag gggactgtca tggccatgat gtacacagcg gtgactccc (SEQ ID NO:416).

OR247

LOCUS AF073983 649 bp DNA ROD 12-JUL-1999
DEFINITION Mus musculus domesticus clone OR912-47M4 olfactory receptor gene, partial cds.
ACCESSION AF073983
KEYWORDS .
SOURCE western European house mouse.
ORGANISM Mus musculus domesticus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia; Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are potentially functional
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Direct Submission
JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5, France
FEATURES Location/Qualifiers
source 1..649
/organism="Mus musculus domesticus"
/sub_species="domesticus"
/db_xref="taxon:10092"
/clone="OR912-47M4"
mRNA <1..>649
/product="olfactory receptor"
CDS <1..>649
/note="region between transmembrane domains TM2 and TM7."
/codon_start=2
/product="olfactory receptor"
/translation="FVDICFTSTTVPKMLVNIQTQSKAITYADCISQMSVFLVFAELD
NFLLAVMAYDRYVAICHPLYYTVIVNQHLCILMVLLSWVVSILHAFLQSSIVLQLTFC
GDVKIPHFFCELNQLSQLTCSDSFSSQLIMNLVPVLLAVISFSSILYSYFKIVSSICS
ISSVQGKYKAFSTCVSHLSIVSLFYSTGLGVYVSSVVIQSSHSAARASVMYTVVTP" (SEQ ID NO:419).
BASE COUNT 148 a 157 c 118 g 226 t
ORIGIN
1 ctttgtggac atctgtttta cctccaccac tgtcccaaag atgctggtaa atatacagac
61 tcaaagcaag gccattacat atgcagactg tattagccag atgtctgtct tcttggtttt
121 tgcagaattg gacaactttc tcctggctgt gatggcctat gaccgatatg tggctatctg
181 tcacccatta tattacacag tcattgttaa ccaacatctc tgtatactga tggttctgct
241 gtcctgggtt gttagcatcc tacatgcctt cttacagagc tcaattgtgc tacagttgac
301 cttttgtgga gatgtaaaaa ttccccactt cttctgtgag cttaaccagc tgtctcaact
361 cacatgttca gacagctttt caagccaact cataatgaat cttgtacctg ttctattggc
421 agtcatttcc ttcagtagta tcctttactc ttatttcaag atagtgtcct ccatatgttc
481 tatctcctca gttcaaggga agtacaaggc attttctaca tgtgtctctc acctttccat
541 tgtctccttа ttttatagta caggccttgg agtgtatgtc agttctgttg tgatccaaag
601 ctctcactct gctgcaagag cctctgtgat gtatactgtg gtcaccccg (SEQ ID NO:418).

OR248

LOCUS AF073984 646 bp DNA ROD 12-JUL-1999
DEFINITION Mus musculus domesticus clone OR912-47M6 olfactory receptor gene, partial cds.
ACCESSION AF073984
KEYWORDS .
SOURCE western European house mouse.
ORGANISM Mus musculus domesticus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia; Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.
REFERENCE 1 (bases 1 to 646)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are potentially functional
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 646)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Direct Submission
JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5, France
FEATURES Location/Qualifiers
source 1..646
/organism="Mus musculus domesticus"
/sub_species="domesticus"
/db_xref="taxon:10092"
/clone="OR912-47M6"
mRNA <1..>646
/product="olfactory receptor"
CDS <1..>646
/note="region between transmembrane domains TM2 and TM7."
/codon_start=2
/product="olfactory receptor"
/translation="SVDVCFSSTTVPKVLAIHILRNQAISFSGCLTQLYFLCVFADMD
NFLLAVMAYDRFVAICHPLHYTTKMTHQLCAFLVVGSWMVASLNALLHTLLVAQLYFC
GDNVIPHFFCEVTPLLKLSCSDTHLNELMILAVAGLIMLAPFVCILLSYILIACAILK
ISSTGRWKAFSTCGSHLAVVCLFYGTIISLYFNPSSSHSAGRDMAAAMMYTVVTP" (SEQ ID NO:421).
BASE COUNT 128 a 178 c 133 g 207 t
ORIGIN
1 ctctgtggat gtatgcttct cctccaccac tgtccctaag gtactggcca ttcacatact
61 aagaaatcaa gccatttcgt tctctgggtg cctcacacag ctgtattttc tctgtgtgtt
121 tgctgacatg gacaatttcc tgctggctgt gatggcctat gaccgatttg tggccatatg
181 ccacccttta cactacacaa caaagatgac ccatcagctt tgtgcctttc ttgttgttgg
241 gtcctggatg gtagccagtc tgaatgctct gttgcacaca ctgctcgtgg ctcaactcta
301 cttctgtggg gacaatgtga tcccccactt cttctgtgaa gtgactcccc tgctgaaact
361 ctcttgctca gacacacatc tcaatgagtt gatgattctt gctgttgcag ggctgataat
421 gttagctcca tttgtttgca tcctcttgtc ttatatcctt attgcttgtg ccatcctgaa
481 aatctcatcc acaggaagat ggaaagcctt ctctacctgt ggctcacact tggctgttgt
541 gtgcctcttc tatggcacta tcatatccct gtatttcaac ccctcatctt ctcactcagc
601 tgggagggac atggcagctg ccatgatgta cacagtggtg accccc (SEQ ID NO:420).

OR249

LOCUS AF073985 650 bp DNA ROD 12-JUL-1999
DEFINITION Mus musculus domesticus clone OR912-47M7 olfactory receptor gene, partial cds.
ACCESSION AF073985
KEYWORDS .
SOURCE western European house mouse.
ORGANISM Mus musculus domesticus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia; Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.
REFERENCE 1 (bases 1 to 650)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are potentially functional
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 650)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Direct Submission
JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5, France
FEATURES Location/Qualifiers
source 1..650
/organism="Mus musculus domesticus"
/sub_species="domesticus"
/db_xref="taxon:10092"
/clone="OR912-47M7"
mRNA <1..>650
/product="olfactory receptor"
CDS <1..>650
/note="region between transmembrane domains TM2 and TM7."
/codon_start=2
/product="olfactory receptor"
/translation="FVDICFTSTTVPKMLVNIQTQSKAITYADCISQMSVFLVFGELD
NFLLAVMAYDRYVAICHPLYYTFIVNQHLCILMVLLSWVVSILHAFLQSSIVLQLTFC
GDVRIPHFFCELNQLSQLTCSDSLSSHLIMHLVPVLLGAISFSSILYSYFKIVSSICS
ISSVQGKYKAFSTCVSHLSIVSLFYSTGLGVYVSSAVVQSSHSAARASVMYTVVTH" (SEQ ID NO:423).
BASE COUNT 148 a 159 c 121 g 222 t
ORIGIN
1 ctttgtggac atctgtttca cctccaccac tgtcccaaag atgctggtaa atatacagac
61 tcaaagcaag gccattacat atgcagactg tattagccag atgtctgtct tcttggtttt
121 tggagaactg gacaactttc tcctggctgt gatggcctat gaccgatatg tggctatctg
181 tcacccattg tattacacat tcattgttaa ccaacatctc tgtatactga tggttctgct
241 gtcctgggtt gttagcatcc tacatgcctt cttacagagc tcaattgtac tacagttgac
301 cttttgtgga gatgtaagaa ttccccactt cttctgtgag cttaaccagc tgtctcaact
361 cacatgttca gacagcttat caagccacct cataatgcat cttgtacctg ttctattggg
421 agccatttcc ttcagtagta tcctttactc ttatttcaag atagtgtcct ccatatgttc
481 tatctcctca gttcaaggga agtacaaggc attttctaca tgtgtctctc acctttccat
541 tgtatcctta ttttatagta caggccttgg agtgtatgtc agttctgctg tggtccaaag
601 ctctcactct gctgcaagag cctctgtgat gtatactgtg gtcacacacg (SEQ ID NO:422).

OR250

LOCUS AF073986 649 bp DNA ROD 12-JUL-1999
DEFINITION Mus musculus domesticus clone OR912-47M8 olfactory receptor gene, partial cds.
ACCESSION AF073986
KEYWORDS .
SOURCE western European house mouse.
ORGANISM Mus musculus domesticus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia; Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are potentially functional
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Direct Submission
JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5, France
FEATURES Location/Qualifiers
source 1..649
/organism="Mus musculus domesticus"
/sub_species="domesticus"
/db_xref="taxon:10092"
/clone="OR912-47M8"
mRNA <1..>649
/product="olfactory receptor"
CDS <1..>649
/note="region between transmembrane domains TM2 and TM7."
/codon_start=2
/product="olfactory receptor"
/translation="FVDICFTSTTVPKVLVNIQTQSKAITYADCISQMSVFLVFAELD
NFLLAVMAYDRYVAICHPLYYTFIVNQHLCILMVLLSWVVSILHAFLQSSIVLQLTFC
GDVKIPHFFCELNQLSQLTCLDSFSSHLIMNLVPVLLAVISFSSILYSYFKIVSSICS
ISSVQGKYKAFSTCVSHLSIVFLFYSTGLGVYVSSAVVQSSHSAARASVMYTVVTP" (SEQ ID NO:425).
BASE COUNT 144 a 159 c 120 g 226 t
ORIGIN
1 ctttgtggac atctgtttca cctccaccac tgtcccaaag gtgctggtaa atatacagac
61 tcaaagcaag gccattacat atgcagactg tattagccag atgtctgtct tcttggtttt
121 tgcagaattg gacaactttc tcctggctgt gatggcctat gaccgatatg tggctatctg
181 tcacccattg tattacacat tcattgttaa ccaacatctc tgtatactga tggttctgct
241 gtcctgggtt gttagcatcc tacatgcctt cttacagagc tcaattgtgc tacagttgac
301 cttttgtgga gatgtaaaaa ttccccactt cttctgcgag cttaaccagc tgtctcaact
361 cacatgttta gacagctttt caagccacct cataatgaat cttgtacctg ttctattggc
421 agtcatttcc ttcagtagta tcctttactc ttatttcaag atagtgtcct ccatatgttc
481 tatctcctca gttcaaggga agtacaaggc attttctaca tgtgtctctc acctttccat
541 tgtcttctta ttttatagta caggccttgg agtgtatgtc agttctgctg tggtccaaag
601 ctctcactct gctgcaagag cctctgtgat gtatactgtg gtcaccccg (SEQ ID NO:424).

OR251

LOCUS AF073987 649 bp DNA ROD 12-JUL-1999
DEFINITION Mus musculus domesticus clone OR912-47M9 olfactory receptor gene, partial cds.
ACCESSION AF073987
KEYWORDS .
SOURCE western European house mouse.
ORGANISM Mus musculus domesticus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia; Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are potentially functional
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Direct Submission
JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5, France
FEATURES Location/Qualifiers
source 1..649
/organism="Mus musculus domesticus"
/sub_species="domesticus"
/db_xref="taxon:10092"
/clone="OR912-47M9"
mRNA <1..>649
/product="olfactory receptor"
CDS <1..>649
/note="region between transmembrane domains TM2 and TM7."
/codon_start=2
/product="olfactory receptor"
/translation="FADLCFSTTTVPQVLVHFLVKRKTISFAGCSTQIVVLLLVGCTE
CALLAVMSYDRYVAVCKPLHYSTIMTHWLCVQLAAGSWASGALVSLVDTTFTLRLPYR
GNNVINHFFCEPPALLKLASADTYSTEMAIFAMGVVILLAPVSLILTSYWNIISTVIQ
MQSGEGRLKVFSTCGSHLIVVVLFYGSAIFAYMRPNSKIMNEKDKMISVFYSAVTP" (SEQ ID NO:427).
BASE COUNT 141 a 175 c 146 g 187 t
ORIGIN
1 ctttgcagat ctctgctttt ctactaccac agtgccccag gtgcttgtcc acttcctggt
61 gaagaggaag accatttctt ttgctggatg ttctacacag atagtggtgt tgcttctggt
121 cggatgcaca gagtgtgcac tgctggcagt gatgtcctat gaccgatatg tggctgtctg
181 caaacctctg cactactcca ccatcatgac acactggcta tgtgttcagc tggctgcagg
241 gtcctgggcc agtggtgcac ttgtgtccct ggtggatacc acattcacat tacgtcttcc
301 ttatcgagga aacaatgtca ttaaccactt tttctgtgaa cctcctgccc tcctgaagct
361 ggcatcggca gatacataca gcacagagat ggcgatcttt gcaatgggtg tggtaatcct
421 cctagcacct gtctccctca tcctcacctc ctactggaac atcatctcca ctgtaatcca
481 gatgcagtct ggggaaggaa ggctcaaggt cttctccacc tgtggctccc acctcattgt
541 tgttgttctc ttctacggct cagcaatatt tgcctacatg aggcccaact ctaagataat
601 gaatgaaaag gataaaatga tttcggtgtt ctattcagca gtgaccccg (SEQ ID NO:426).

OR252

LOCUS AF073988 649 bp DNA ROD 12-JUL-1999
DEFINITION Mus musculus domesticus clone OR9M olfactory receptor gene, partial cds.
ACCESSION AF073988
KEYWORDS .
SOURCE western European house mouse.
ORGANISM Mus musculus domesticus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia; Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are potentially functional
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Direct Submission
JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5, France
FEATURES Location/Qualifiers
source 1..649
/organism="Mus musculus domesticus"
/sub_species="domesticus"
/db_xref="taxon:10092"
/clone="OR9M"
mRNA <1..>649
/product="olfactory receptor"
CDS <1..>649
/note="region between transmembrane domains TM2 and TM7."
/codon_start=2
/product="olfactory receptor"
/translation="FTDLCFSSVTMPKLLQNMQSQVPSIPYAGCLTQMYFFLFFGDLE
SFLLVAMAYDRYVAICFPLHYTSIMSPRLCVSLVLLSWLLTMSHSMLHTLLLTRLSFC
ENNVIPHFFCDLSALLKLACSDIHINELVILIIGGLVVILPFLLVTVSYARIISSILK
VPSTRGIHKVFSTCGSHLSVVSLFYGTIIGLYLCPSANNSTLKDTVMSLMYTVVTP" (SEQ ID NO:429).
BASE COUNT 126 a 177 c 123 g 223 t
ORIGIN
1 cttcactgac ctctgctttt cctctgtcac aatgcccaag ttgctgcaga acatgcagag
61 ccaagttcct tcaatcccct atgcaggctg cctgacacaa atgtacttct ttttgttttt
121 tggagatctt gagagcttcc tccttgtggc catggcctat gaccgatatg tagccatctg
181 cttccctctt cattacacca gcattatgag ccccaggctc tgtgtgagtc ttgtgctgct
241 gtcctggttg ctgaccatgt cccattccat gctgcacact ttgctcttaa ctaggttgtc
301 tttctgtgaa aacaatgtga tcccccattt tttctgtgat ctgtctgctc tgctgaagct
361 ggcctgctct gatattcaca ttaatgaatt ggtgatattg atcataggag ggcttgttgt
421 tatacttcca tttctactcg tcacagtgtc ttatgcacgc atcatctcct ccattctcaa
481 ggtcccttca actcgaggca tccacaaggt cttctccact tgtggttctc acctgtctgt
541 ggtgtcactg ttctatggga caattattgg cctctactta tgtccatctg ctaataactc
601 tactctaaag gacactgtca tgtctctgat gtacactgtg gtaactccc (SEQ ID NO:428).

OR253

LOCUS AF073989 1865 bp DNA ROD 12-JUL-1999
DEFINITION Mus musculus clone OR1-72M13 olfactory receptor gene, complete cds.
ACCESSION AF073989
KEYWORDS .
SOURCE house mouse.
ORGANISM Mus musculus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.
REFERENCE 1 (bases 1 to 1865)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are
potentially functional
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 1865)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Direct Submission
JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS
UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5,
France
FEATURES Location/Qualifiers
source 1..1865
/organism="Mus musculus"
/db_xref="taxon:10090"
/clone="OR1-72M13"
/cell_line="NIH3T3"
mRNA 547..1482
/product="olfactory receptor"
CDS 547..1482
/note="orthologous to human gene OR1-72"
/codon_start=1
/product="olfactory receptor"
/translation="MKPENQTKYFRIFASGVFQYPEHQPMLFGLFLLMFVVAVLGNLL
IILAVSIDSHLHTPMYFFLSNLSFSDIGFISTTVPKMLVNIQTQSKSISYAECITQIY
FFMLFGGMDTLLLTVMAYDRFVAICHPLHYSVIMNPQLSGLLVLVSWFISFSYSLIQS
LLMLRLSFCTNQIIKHFYCEYAKALTIACSDTLINHILLYIVIWVLGFIPFSGILYSY
YKIFSSILRIPSTDGKYKAFSTCGSHLSVVSLFYGTGLSVYLSSDATSSSGKGVVASV
MYTVVTPMLNPFIYSLRNKDIKKALKTLGRILLLK" (SEQ ID NO:431).
BASE COUNT 568 a 355 c 321 g 621 t
ORIGIN
1 ctgcagagtg agttctagga cagccaggac tacacagaga aaccctgaat caaaataaaa
61 taaaataaaa tacaatagaa taaaataaaa taaacaaaaa agaaaaaaga agataaagat
121 gtctaagaga agaatgagat ttcaaaagga atggatacag agaaggtatg gtcatattca
181 cagagacctt tctgaatgat cagaacttag tgtaaccact gaaaaatgtt gagaagtgaa
241 gttggaaatc agagttgatc catcataaag gattacagca cttttagaaa ctgactgctt
301 tgatctaaca cttccagagg ttatctggtc ttcatgtggt ttaaaatttg tagagttagc
361 agttctaagt agagataagg tagagaaact aataatgatg agaaaatgca ggattcctaa
421 tttttattgt aataaaagct ttatgtacag ttattccaac acataaaagg acagagacct
481 tagagactgt agtgtatgtt cctcaatctt tctctccagt aggtgtctag cttatttgtc
541 aacaacatga aaccagaaaa ccaaacaaaa tattttagaa tttttgcttc tggggttttc

661 gtgcttggga atcttctcat cattctggcc gtcagcattg actctcacct gcatactccc
721 atgtacttct ttctatctaa cctgtccttt tctgacattg gtttcatctc tacaactgtc
781 cctaagatgt tggtgaatat ccaaacacag agcaagtcca tctcctatgc agaatgcatc
841 acccagattt atttttttcat gctctttgga ggcatggaca cacttctcct caccgtgatg
901 gcctatgacc gatttgtggc catctgtcac ccacttcact attcagtcat tatgaatcct
961 caactaagtg gtttgctagt tcttgtatca tggtttatta gcttttcata ttctctgata
1021 cagagtctat tgatgctgcg gttgtccttc tgtacaaatc agataattaa acacttttac
1081 tgtgaatatg ccaaagccct cactatagcc tgctcagata cactaatcaa tcatatcctt
1141 ctttatattg tgatatgggt ccttggcttc atccctttct cagggatcct ttattcatac
1201 tataaaattt tttcttcaat tttgagaatt ccatcaacag atggaaaata taaagcattt
1261 tctacctgtg ggtctcatct atcggtggtt tctttattct atgggacagg ccttagtgtg
1321 taccttagtt ctgatgctac ttcctcctct gggaagggcg tggtggcctc agtaatgtat
1381 acagtggtca cccccatgct gaacccttte atctacagct tgaggaacaa agacattaag
1441 aaggccttaa aaacacttgg gagaatactt cttttaaagt gataatttca ctggttttag
1501 acatctgaac tgatagaaat aaaatagtga actaaagaaa ttctgtacta taatcatgta
1561 gaaattttat ccagtttgtt ggtctatctt tgattaaaat tatactgtga atatttctat
1621 ctgaaatttc tatgatgcct ccttttttat tcgaagttct ttgtctcctc ccctgtttta
1681 tacgacatat ttctttactt cagtacaaag tctacatttc agcatgccaa tataaccatt
1741 caaataccaa ttcatgaatt gtttagtaaa agttatgcaa tggctcattt acagaaagtc
1801 catgtatata tatataacac tgttgtgggt tggtccgact ctgtattctg atattaattc
1861 tgcag (SEQ ID NO:430).

As used herein, the terms "ORX nucleic acid sequence" and/or "ORX nucleic acid molecule" specifically refer to the sequences of GenBank Accession Nos. AF022649, AF073959-073989, AF127814-127907, and AF179716-179843.

Likewise, the term "ORX polypeptide" specifically refers to the polypeptide sequences of GenBank Accession Nos. AF127814, AF127816-127819, AF127821-127824, AF127836-127837, AF127840, AF127845-127848, AF127851-127852, AF127857, AF127859, AF127861-127862, AF127865, AF127867-127868, AF127870-127872, AF127874-127884, AF127886, AF127888, AF127896-127904, AF127906-127907, AF179716-179717, AF179720-179728, AF179730-179737, AF179739-179746, AF179748-179750, AF179752, AF179755-179756, AF179758-179761, AF179766-179767, AF179770-179771, AF179773-179775, AF179777-179779, AF179784-179788, AF179790-179792, AF179794, AF179796-179799, AF179802-179811, AF179814, AF179816-179818, AF179820, AF179822-179832, AF179834-179839, AF179841-179843, and AF073959-073989.

To sample the ORX genes in primate species, ORX genes were randomly sequenced from anthropoids and prosimians (*See* FIG. 1). As outlined in Examples 1-3, *infra*, ORX genes were obtained by PCR on genomic DNA from the different species using consensus ORX primer pairs OR5B-OR3B and OR3.1-OR7.1 chosen respectively in the transmembrane

individual ORX clones were sequenced per taxon. A total of 221 ORX sequences, representing ten species, was analyzed. These sequences are distributed in different groups whose percentage of nucleotide sequence identity (NSI) ranges from ~35 to >99%. The corresponding amino acid sequences were compared to a variety of ORX sequences from the public databases and previous studies. *See* Rouquier et al., (1998) *Nature Genet.* 18, 243-50.

All sequences have the characteristic features of olfactory receptors, with a heptahelical structure and conserved motifs as previously defined. *See* Buck et al., (1991) *Cell* 65, 175-187; Rouquier et al., (1998) *Nature Genet.* 18, 243-50; and Rouquier et al., (1998) *Hum. Mol. Genet.* 7, 1337-45. The use of two pairs of consensus primers made the sampling representative of the ORX gene repertoire. Primate sequences are distributed in seven families (sequences that share >40% amino-acid identity (ASI) define a family), and 56 subfamilies (sequences that share >60% ASI define a subfamily). Group 1-II of family 1 represents the zone of overlap of sequences derived from using the two primer pairs (*See* FIG. 2).

Non-human primate ORX genes are represented in 6 families and about 45 subfamilies. Numerous sequences are grouped in family 1 (~66%) comprising subfamily 1A, the largest subfamily (57/221, 26%). Subfamily 1B is almost devoid of coding human ORX sequences (FIG. 2). Subfamily 1A contains only human pseudogenes originating from chromosomes 14 and 19 whereas subfamily 1B contains human pseudogenes lying on various chromosomes. As has been previously found for human, the amino-acid sequences deduced from the non-human primate sequences revealed many pseudogenes (FIG. 2 and Table 1).

Table 1 provides information about the evolution of the pseudogene fraction along with the evolution of primates. Hominoids present the highest fraction of pseudogenes (39 to >70%, average ~50%). Old world monkeys (macaque and baboon) have a lower pseudogene fraction (20 to 35%, average 27%), while even fewer pseudogenes were found among the sequences derived from new world monkeys. Only one pseudogene (SBO64) was identified among the 49 sequences obtained from marmoset and two species of squirrel-monkey. In contrast, 37% of the prosimian lemur ORX sequences were pseudogenes.

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TABLE 1

Species						
	Common name		**Number of sequences analyzed**	**% ORF**	**% pseudogenes**	**Average % pseudogenes**
Hominoids	Human	Homo sapiens (HSA)	99	30	70	**50 %**
	Chimpanzee	Pan troglodytes (PTR)	21	52	48	
	Gorilla	Gorilla gorilla (GGO)	18	50	50	
	Orangutan	Pongo pygmaeus (PPY)	23	61	39	
	Gibbon	Hylobates lar (HLA)	22	59	41	
Old world monkeys	Macaque	Macaca sylvanus (MSY)	20	65	35	**27 %**
	Baboon	Papio papio (PPA)	21	81	19	
New world monkeys	Marmoset	Callithrix jacchus (CJA)	19	100	0	**2 %**
	Squirrel-monkey	Saimiri scireus (SSC)	15	100	0	
		Saimiri bolivensis (SBO)	15	93	7	

Prosimians	Lemur	Eulemur fulvus (EFU)	19	58	42	**37 %**
		Eulemur rubriventer (ERU)	16	69	31	
Rodents	Mouse	Mus musculus (MMU)	33	100	0	**0 %**
Fish	Zebrafish	Danio rerio (DRE)	3	100	0	**0 %**

Diverse reasons have been suggested that could account for the differences in olfactory ability among mammals, *i.e.,* the size of the anatomical structures devoted to olfaction (olfactory epithelium, olfactory bulb, cortical structures), or the number of ORX families/subfamilies, and the total number and diversity of expressed ORX genes. The olfactory epithelial surface of macrosmatic animals, such as dogs, is larger than in microsmatic humans. On the other hand, using unique dog sequence probes that represent specific ORX subfamilies and which will not cross-hybridize with other subfamilies, comparative analyses have been performed by Southern blot analysis among a panel of mammals including dog and human. The number of ORX sequences per subfamily is similar in microsmatic and macrosmatic animals. A high fraction (>70%) of the human ORX genes have been mutated during evolution into pseudogenes. Chromosomes 7, 16 or 17 contained a high fraction of potentially coding ORX sequences, whereas other chromosomes such as chromosome 3 or 11 contained primarily pseudogenes. Other studies on chromosome 17 and on chromosome 11 in which 75% of the ORX sequences identified were pseudogenes, support these observations.

All ORX sequences derived from mouse are potentially coding. No pseudogenes were detected either by sequencing randomly selected ORX sequences or by deliberately screening with human ORX pseudogene probes. This indicates that the ORX pseudogene content is either zero or restricted to rare examples in mouse.

Thus, the reduction of the sense of smell could correlate with the fraction of functional ORX genes in the genome.

It is difficult to measure and compare the olfactory efficiency of different animal species. Various parameters such as the threshold of detection of odorants (sensitivity), the range of odors detectable and the discriminatory power (acuity) are key parts of the olfactory ability. Thus it is uncertain to determine precisely which of these parameters are taken in account when comparing two species, and therefore the origin of the olfactory deficiency of primates remains a controversial and difficult point to address.

The chromosomal distribution of the ORX gene repertoire arose through multiple duplication rounds giving rise to paralogous regions. Even though the number of duplication events may be different among the mammals, overall it appears that the number of ORX genes was established before the divergence of mammals. *See* Ben-Arie et al., (1994) *Hum. Mol. Genet.* 3, 229-35. This explains why, by Southern analysis, there is no striking difference in the

number of ORX genes of four different subfamilies between the sea lion, which has an underdeveloped olfactory apparatus, and other mammals. *See id.* On the other hand, the Southern blot approach does not reveal the functionality of the ORX sequences, and we predict that a large fraction of the sea lion ORX genes could be pseudogenes as has been described for the dolphin. *See* Sharon et al., (1999) *Genomics*, 61, 24-36. Similarly striking differences have been observed in the olfactory ability of different breeds of dogs. *See* Issel-Tarver et al., (1996) *Proc. Natl. Acad. Sci. USA* 93, 10897-902. Despite the variations in the size of the olfactory epithelium of the different breeds, it would be interesting to know what the biological basis is for the differences in performances observed between sight and scent hounds. One obvious possibility is loss of functional ORX genes, but, given the recent origin of all modern dogs this explanation seems unlikely. Other explanations could be changes in behavior, or in expression brought about by the modification of a key master transcription factor or in the unusual mechanism that allows only one ORX gene allele or the other to be expressed exclusively in any one epithelium cell.

ORX Nucleic Acids

The nucleic acids of the invention include those that encode an ORX polypeptide or protein. As used herein, the terms polypeptide and protein are interchangeable.

In some embodiments, an ORX nucleic acid encodes a mature ORX polypeptide. As used herein, a "mature" form of a polypeptide or protein described herein relates to the product of a naturally occurring polypeptide or precursor form or proprotein. The naturally occurring polypeptide, precursor or proprotein includes, by way of nonlimiting example, the full-length gene product, encoded by the corresponding gene. Alternatively, it may be defined as the polypeptide, precursor or proprotein encoded by an open reading frame described herein. The product "mature" form arises, again by way of nonlimiting example, as a result of one or more naturally occurring processing steps that may take place within the cell in which the gene product arises. Examples of such processing steps leading to a "mature" form of a polypeptide or protein include the cleavage of the N-terminal methionine residue encoded by the initiation codon of an open reading frame, or the proteolytic cleavage of a signal peptide or leader sequence. Thus a mature form arising from a precursor polypeptide or protein that has residues 1 to N, where residue 1 is the N-terminal methionine, would have residues 2 through N remaining after removal

of the N-terminal methionine. Alternatively, a mature form arising from a precursor polypeptide or protein having residues 1 to N, in which an N-terminal signal sequence from residue 1 to residue M is cleaved, would have the residues from residue M+1 to residue N remaining. Further as used herein, a "mature" form of a polypeptide or protein may arise from a step of post-translational modification other than a proteolytic cleavage event. Such additional processes include, by way of non-limiting example, glycosylation, myristoylation or phosphorylation. In general, a mature polypeptide or protein may result from the operation of only one of these processes, or a combination of any of them.

Among the ORX nucleic acids is the nucleic acid whose sequence is provided by GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843, or a fragment thereof. Additionally, the invention includes mutant or variant nucleic acids of GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843, or a fragment thereof, any of whose bases may be changed from the corresponding bases shown in the ORX nucleic acids, while still encoding a protein that maintains at least one of its ORX-like activities and physiological functions (*i.e.,* modulating angiogenesis, neuronal development). The invention further includes the complement of the nucleic acid sequence of GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843, including fragments, derivatives, analogs and homologs thereof. The invention additionally includes nucleic acids or nucleic acid fragments, or complements thereto, whose structures include chemical modifications.

One aspect of the invention pertains to isolated nucleic acid molecules that encode ORX proteins or biologically active portions thereof. Also included are nucleic acid fragments sufficient for use as hybridization probes to identify ORX-encoding nucleic acids (*e.g.*, ORX mRNA) and fragments for use as polymerase chain reaction (PCR) primers for the amplification or mutation of ORX nucleic acid molecules. As used herein, the term "nucleic acid molecule" is intended to include DNA molecules (*e.g.*, cDNA or genomic DNA), RNA molecules (*e.g.*, mRNA), analogs of the DNA or RNA generated using nucleotide analogs, and derivatives, fragments and homologs thereof. The nucleic acid molecule can be single-stranded or double-stranded, but preferably is double-stranded DNA.

"Probes" refer to nucleic acid sequences of variable length, preferably between at least about 10 nucleotides (nt), 100 nt, or as many as about, *e.g.*, 6,000 nt, depending on use. Probes

are used in the detection of identical, similar, or complementary nucleic acid sequences. Longer length probes are usually obtained from a natural or recombinant source, are highly specific and much slower to hybridize than oligomers. Probes may be single- or double-stranded and designed to have specificity in PCR, membrane-based hybridization technologies, or ELISA-like technologies.

An "isolated" nucleic acid molecule is one that is separated from other nucleic acid molecules that are present in the natural source of the nucleic acid. Examples of isolated nucleic acid molecules include, but are not limited to, recombinant DNA molecules contained in a vector, recombinant DNA molecules maintained in a heterologous host cell, partially or substantially purified nucleic acid molecules, and synthetic DNA or RNA molecules. Preferably, an "isolated" nucleic acid is free of sequences which naturally flank the nucleic acid (*i.e.*, sequences located at the 5' and 3' ends of the nucleic acid) in the genomic DNA of the organism from which the nucleic acid is derived. For example, in various embodiments, the isolated ORX nucleic acid molecule can contain less than about 50 kb, 25 kb, 5 kb, 4 kb, 3 kb, 2 kb, 1 kb, 0.5 kb or 0.1 kb of nucleotide sequences which naturally flank the nucleic acid molecule in genomic DNA of the cell from which the nucleic acid is derived. Moreover, an "isolated" nucleic acid molecule, such as a cDNA molecule, can be substantially free of other cellular material or culture medium when produced by recombinant techniques, or of chemical precursors or other chemicals when chemically synthesized.

A nucleic acid molecule of the present invention, *e.g.*, a nucleic acid molecule having the nucleotide sequence of GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843, or a complement of any of these nucleotide sequences, can be isolated using standard molecular biology techniques and the sequence information provided herein. Using all or a portion of the nucleic acid sequence of GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843, as a hybridization probe, ORX nucleic acid sequences can be isolated using standard hybridization and cloning techniques (*e.g.*, as described in Sambrook *et al.*, eds., MOLECULAR CLONING: A LABORATORY MANUAL 2nd Ed., Cold Spring Harbor Laboratory Press, Cold Spring Harbor, NY, 1989; and Ausubel, *et al.*, eds., CURRENT PROTOCOLS IN MOLECULAR BIOLOGY, John Wiley & Sons, New York, NY, 1993.)

A nucleic acid of the invention can be amplified using cDNA, mRNA or alternatively, genomic DNA, as a template and appropriate oligonucleotide primers according to standard PCR amplification techniques. The nucleic acid so amplified can be cloned into an appropriate vector and characterized by DNA sequence analysis. Furthermore, oligonucleotides corresponding to ORX nucleotide sequences can be prepared by standard synthetic techniques, *e.g.*, using an automated DNA synthesizer.

As used herein, the term "oligonucleotide" refers to a series of linked nucleotide residues, which oligonucleotide has a sufficient number of nucleotide bases to be used in a PCR reaction. A short oligonucleotide sequence may be based on, or designed from, a genomic or cDNA sequence and is used to amplify, confirm, or reveal the presence of an identical, similar or complementary DNA or RNA in a particular cell or tissue. Oligonucleotides comprise portions of a nucleic acid sequence having about 10 nt, 50 nt, or 100 nt in length, preferably about 15 nt to 30 nt in length. In one embodiment, an oligonucleotide comprising a nucleic acid molecule less than 100 nt in length would further comprise at lease 6 contiguous nucleotides of GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843, or a complement thereof. Oligonucleotides may be chemically synthesized and may be used as probes.

In another embodiment, an isolated nucleic acid molecule of the invention comprises a nucleic acid molecule that is a complement of the nucleotide sequences shown in GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843, or a portion of this nucleotide sequence. A nucleic acid molecule that is complementary to the nucleotide sequences shown in GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843 is one that is sufficiently complementary to the nucleotide sequences shown in GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843 that it can hydrogen bond with little or no mismatches to the nucleotide sequences shown in GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843, thereby forming a stable duplex.

As used herein, the term "complementary" refers to Watson-Crick or Hoogsteen base pairing between nucleotide units of a nucleic acid molecule, and the term "binding" means the physical or chemical interaction between two polypeptides or compounds or associated polypeptides or compounds or combinations thereof. Binding includes ionic, non-ionic, Von der

Waals, hydrophobic interactions, etc. A physical interaction can be either direct or indirect. Indirect interactions may be through or due to the effects of another polypeptide or compound. Direct binding refers to interactions that do not take place through, or due to, the effect of another polypeptide or compound, but instead are without other substantial chemical intermediates.

Moreover, the nucleic acid molecule of the invention can comprise only a portion of the nucleic acid sequence of GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843, *e.g.*, a fragment that can be used as a probe or primer, or a fragment encoding a biologically active portion of ORX. Fragments provided herein are defined as sequences of at least 6 (contiguous) nucleic acids or at least 4 (contiguous) amino acids, a length sufficient to allow for specific hybridization in the case of nucleic acids or for specific recognition of an epitope in the case of amino acids, respectively, and are at most some portion less than a full length sequence. Fragments may be derived from any contiguous portion of a nucleic acid or amino acid sequence of choice. Derivatives are nucleic acid sequences or amino acid sequences formed from the native compounds either directly or by modification or partial substitution. Analogs are nucleic acid sequences or amino acid sequences that have a structure similar to, but not identical to, the native compound but differs from it in respect to certain components or side chains. Analogs may be synthetic or from a different evolutionary origin and may have a similar or opposite metabolic activity compared to wild type.

Derivatives and analogs may be full length or other than full length, if the derivative or analog contains a modified nucleic acid or amino acid, as described below. Derivatives or analogs of the nucleic acids or proteins of the invention include, but are not limited to, molecules comprising regions that are substantially homologous to the nucleic acids or proteins of the invention, in various embodiments, by at least about 70%, 80%, 85%, 90%, 95%, 98%, or even 99% identity (with a preferred identity of 80-99%) over a nucleic acid or amino acid sequence of identical size or when compared to an aligned sequence in which the alignment is done by a computer homology program known in the art, or whose encoding nucleic acid is capable of hybridizing to the complement of a sequence encoding the aforementioned proteins under stringent, moderately stringent, or low stringent conditions. See *e.g.* Ausubel, *et al.*, CURRENT PROTOCOLS IN MOLECULAR BIOLOGY, John Wiley & Sons, New York, NY, 1993, and below. An exemplary program is the Gap program (Wisconsin Sequence Analysis Package, Version 8 for UNIX, Genetics Computer Group, University Research Park, Madison, WI) using the default

settings, which uses the algorithm of Smith and Waterman (Adv. Appl. Math., 1981, 2: 482-489, which is incorporated herein by reference in its entirety).

A "homologous nucleic acid sequence" or "homologous amino acid sequence," or variations thereof, refer to sequences characterized by a homology at the nucleotide level or amino acid level as discussed above. Homologous nucleotide sequences encode those sequences coding for isoforms of an ORX polypeptide. Isoforms can be expressed in different tissues of the same organism as a result of, for example, alternative splicing of RNA. Alternatively, isoforms can be encoded by different genes. In the present invention, homologous nucleotide sequences include nucleotide sequences encoding for an ORX polypeptide of species other than humans, including, but not limited to, mammals, and thus can include, *e.g.*, mouse, rat, rabbit, dog, cat cow, horse, and other organisms. Homologous nucleotide sequences also include, but are not limited to, naturally occurring allelic variations and mutations of the nucleotide sequences set forth herein. A homologous nucleotide sequence does not, however, include the nucleotide sequence encoding human ORX protein. Homologous nucleic acid sequences include those nucleic acid sequences that encode conservative amino acid substitutions (see below) in the amino acid sequence of an ORX polypeptide, as well as a polypeptide having ORX activity. Biological activities of the ORX proteins are described below. A homologous amino acid sequence does not encode the amino acid sequence of a human ORX polypeptide.

The nucleotide sequence determined from the cloning of the human ORX gene allows for the generation of probes and primers designed for use in identifying and/or cloning ORX homologues in other cell types, *e.g.*, from other tissues, as well as ORX homologues from other mammals. The probe/primer typically comprises a substantially purified oligonucleotide. The oligonucleotide typically comprises a region of nucleotide sequence that hybridizes under stringent conditions to at least about 12, 25, 50, 100, 150, 200, 250, 300, 350 or 400 or more consecutive sense strand nucleotide sequences of GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843; or an anti-sense strand nucleotide sequence of GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843; or of a naturally occurring mutant of GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843.

Probes based on the human ORX nucleotide sequence can be used to detect transcripts or genomic sequences encoding the same or homologous proteins. In various embodiments, the

probe further comprises a label group attached thereto, *e.g.*, the label group can be a radioisotope, a fluorescent compound, an enzyme, or an enzyme co-factor. Such probes can be used as a part of a diagnostic test kit for identifying cells or tissue which misexpress an ORX protein, such as by measuring a level of an ORX-encoding nucleic acid in a sample of cells from a subject *e.g.*, detecting ORX mRNA levels or determining whether a genomic ORX gene has been mutated or deleted.

A "polypeptide having a biologically active portion of ORX" refers to polypeptides exhibiting activity similar, but not necessarily identical to, an activity of a polypeptide of the present invention, including mature forms, as measured in a particular biological assay, with or without dose dependency. A nucleic acid fragment encoding a "biologically active portion of ORX" can be prepared by isolating a portion of an ORX nucleic acid that encodes a polypeptide having an ORX biological activity (biological activities of the ORX proteins are described below), expressing the encoded portion of ORX protein (*e.g.*, by recombinant expression *in vitro*) and assessing the activity of the encoded portion of ORX. For example, a nucleic acid fragment encoding a biologically active portion of ORX can optionally include an ATP-binding domain. In another embodiment, a nucleic acid fragment encoding a biologically active portion of ORX includes one or more regions.

ORX Variants

The invention further encompasses nucleic acid molecules that differ from the nucleotide sequences shown in GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843 due to the degeneracy of the genetic code. These nucleic acid molecules thus encode the same ORX protein as that encoded by the nucleotide sequences shown in GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843 *e.g.*, the ORX polypeptides.

In addition to the human ORX nucleic acids, it will be appreciated by those skilled in the art that DNA sequence polymorphisms that lead to changes in the amino acid sequences of ORX may exist within a population (*e.g.*, the human population). Such genetic polymorphism in the ORX gene may exist among individuals within a population due to natural allelic variation. As used herein, the terms "gene" and "recombinant gene" refer to nucleic acid molecules comprising an open reading frame encoding an ORX protein, preferably a mammalian ORX protein. Such

natural allelic variations can typically result in 1-5% variance in the nucleotide sequence of the ORX gene. Any and all such nucleotide variations and resulting amino acid polymorphisms in ORX that are the result of natural allelic variation and that do not alter the functional activity of ORX are intended to be within the scope of the invention.

Moreover, nucleic acid molecules encoding ORX proteins from other species, and thus that have a nucleotide sequence that differs from the human sequence of the ORX nucleic acid molecules are intended to be within the scope of the invention. Nucleic acid molecules corresponding to natural allelic variants and homologues of the ORX cDNAs of the invention can be isolated based on their homology to the human ORX nucleic acids disclosed herein using the human cDNAs, or a portion thereof, as a hybridization probe according to standard hybridization techniques under stringent hybridization conditions. For example, a soluble human ORX cDNA can be isolated based on its homology to human membrane-bound ORX. Likewise, a membrane-bound human ORX cDNA can be isolated based on its homology to soluble human ORX.

Accordingly, in another embodiment, an isolated nucleic acid molecule of the invention is at least 6 nucleotides in length and hybridizes under stringent conditions to the nucleic acid molecule comprising the nucleotide sequence of GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843. In another embodiment, the nucleic acid is at least 10, 25, 50, 100, 250, 500 or 750 nucleotides in length. In another embodiment, an isolated nucleic acid molecule of the invention hybridizes to the coding region. As used herein, the term "hybridizes under stringent conditions" is intended to describe conditions for hybridization and washing under which nucleotide sequences at least 60% homologous to each other typically remain hybridized to each other.

Homologs (*i.e.,* nucleic acids encoding ORX proteins derived from species other than human) or other related sequences (*e.g.,* paralogs) can be obtained by low, moderate or high stringency hybridization with all or a portion of the particular human sequence as a probe using methods well known in the art for nucleic acid hybridization and cloning.

As used herein, the phrase "stringent hybridization conditions" refers to conditions under which a probe, primer or oligonucleotide will hybridize to its target sequence, but to no other sequences. Stringent conditions are sequence-dependent and will be different in different circumstances. Longer sequences hybridize specifically at higher temperatures than shorter

sequences. Generally, stringent conditions are selected to be about 5 °C lower than the thermal melting point (T_m) for the specific sequence at a defined ionic strength and pH. The Tm is the temperature (under defined ionic strength, pH and nucleic acid concentration) at which 50% of the probes complementary to the target sequence hybridize to the target sequence at equilibrium. Since the target sequences are generally present at excess, at Tm, 50% of the probes are occupied at equilibrium. Typically, stringent conditions will be those in which the salt concentration is less than about 1.0 M sodium ion, typically about 0.01 to 1.0 M sodium ion (or other salts) at pH 7.0 to 8.3 and the temperature is at least about 30 °C for short probes, primers or oligonucleotides (*e.g.*, 10 nt to 50 nt) and at least about 60°C for longer probes, primers and oligonucleotides. Stringent conditions may also be achieved with the addition of destabilizing agents, such as formamide.

Stringent conditions are known to those skilled in the art and can be found in CURRENT PROTOCOLS IN MOLECULAR BIOLOGY, John Wiley & Sons, N.Y. (1989), 6.3.1-6.3.6. Preferably, the conditions are such that sequences at least about 65%, 70%, 75%, 85%, 90%, 95%, 98%, or 99% homologous to each other typically remain hybridized to each other. A non-limiting example of stringent hybridization conditions is hybridization in a high salt buffer comprising 6X SSC, 50 mM Tris-HCl (pH 7.5), 1 mM EDTA, 0.02% PVP, 0.02% Ficoll, 0.02% BSA, and 500 mg/ml denatured salmon sperm DNA at 65 °C. This hybridization is followed by one or more washes in 0.2X SSC, 0.01% BSA at 50 °C. An isolated nucleic acid molecule of the invention that hybridizes under stringent conditions to the sequence of GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843 corresponds to a naturally occurring nucleic acid molecule. As used herein, a "naturally-occurring" nucleic acid molecule refers to an RNA or DNA molecule having a nucleotide sequence that occurs in nature (*e.g.*, encodes a natural protein).

In a second embodiment, a nucleic acid sequence that is hybridizable to the nucleic acid molecule comprising the nucleotide sequence of GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843, or fragments, analogs or derivatives thereof, under conditions of moderate stringency is provided. A non-limiting example of moderate stringency hybridization conditions are hybridization in 6X SSC, 5X Denhardt's solution, 0.5% SDS and 100 mg/ml denatured salmon sperm DNA at 55°C, followed by one or more washes in 1X SSC, 0.1% SDS at 37 °C. Other conditions of moderate stringency

that may be used are well known in the art. See, *e.g.*, Ausubel *et al.* (eds.), 1993, CURRENT PROTOCOLS IN MOLECULAR BIOLOGY, John Wiley & Sons, NY, and Kriegler, 1990, GENE TRANSFER AND EXPRESSION, A LABORATORY MANUAL, Stockton Press, NY.

In a third embodiment, a nucleic acid that is hybridizable to the nucleic acid molecule comprising the nucleotide sequence of GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843, or fragments, analogs or derivatives thereof, under conditions of low stringency, is provided. A non-limiting example of low stringency hybridization conditions are hybridization in 35% formamide, 5X SSC, 50 mM Tris-HCl (pH 7.5), 5 mM EDTA, 0.02% PVP, 0.02% Ficoll, 0.2% BSA, 100 mg/ml denatured salmon sperm DNA, 10% (wt/vol) dextran sulfate at 40 °C, followed by one or more washes in 2X SSC, 25 mM Tris-HCl (pH 7.4), 5 mM EDTA, and 0.1% SDS at 50 °C. Other conditions of low stringency that may be used are well known in the art (*e.g.*, as employed for cross-species hybridizations). See, *e.g.*, Ausubel *et al.* (eds.), 1993, CURRENT PROTOCOLS IN MOLECULAR BIOLOGY, John Wiley & Sons, NY, and Kriegler, 1990, GENE TRANSFER AND EXPRESSION, A LABORATORY MANUAL, Stockton Press, NY; Shilo and Weinberg, 1981, *Proc Natl Acad Sci USA 78*: 6789-6792.

Conservative mutations

In addition to naturally-occurring allelic variants of the ORX sequence that may exist in the population, the skilled artisan will further appreciate that changes can be introduced by mutation into the nucleotide sequence of the ORX nucleic acid molecules, thereby leading to changes in the amino acid sequence of the encoded ORX protein, without altering the functional ability of the ORX protein. For example, nucleotide substitutions leading to amino acid substitutions at "non-essential" amino acid residues can be made in the sequence of GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843. A "non-essential" amino acid residue is a residue that can be altered from the wild-type sequence of ORX without altering the biological activity, whereas an "essential" amino acid residue is required for biological activity. For example, amino acid residues that are conserved among the ORX proteins of the present invention, are predicted to be particularly unamenable to alteration.

Another aspect of the invention pertains to nucleic acid molecules encoding ORX proteins that contain changes in amino acid residues that are not essential for activity. Such ORX

proteins differ in amino acid sequence from the ORX polypeptides, yet retain biological activity. In one embodiment, the isolated nucleic acid molecule comprises a nucleotide sequence encoding a protein, wherein the protein comprises an amino acid sequence at least about 75% homologous to the amino acid sequence of the ORX polypeptides. Preferably, the protein encoded by the nucleic acid is at least about 80% homologous to the sequence of an ORX polypeptide, more preferably at least about 90%, 95%, 98%, and most preferably at least about 99% homologous to the sequence of an ORX polypeptide.

An isolated nucleic acid molecule encoding an ORX protein homologous to the protein of can be created by introducing one or more nucleotide substitutions, additions or deletions into the nucleotide sequence of GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843, such that one or more amino acid substitutions, additions or deletions are introduced into the encoded protein.

Mutations can be introduced into the nucleotide sequence of the ORX nucleic acid molecules by standard techniques, such as site-directed mutagenesis and PCR-mediated mutagenesis. Preferably, conservative amino acid substitutions are made at one or more predicted non-essential amino acid residues. A "conservative amino acid substitution" is one in which the amino acid residue is replaced with an amino acid residue having a similar side chain. Families of amino acid residues having similar side chains have been defined in the art. These families include amino acids with basic side chains (*e.g.*, lysine, arginine, histidine), acidic side chains (*e.g.*, aspartic acid, glutamic acid), uncharged polar side chains (*e.g.*, glycine, asparagine, glutamine, serine, threonine, tyrosine, cysteine), nonpolar side chains (*e.g.*, alanine, valine, leucine, isoleucine, proline, phenylalanine, methionine, tryptophan), beta-branched side chains (*e.g.*, threonine, valine, isoleucine) and aromatic side chains (*e.g.*, tyrosine, phenylalanine, tryptophan, histidine). Thus, a predicted nonessential amino acid residue in ORX is replaced with another amino acid residue from the same side chain family. Alternatively, in another embodiment, mutations can be introduced randomly along all or part of an ORX coding sequence, such as by saturation mutagenesis, and the resultant mutants can be screened for ORX biological activity to identify mutants that retain activity. Following mutagenesis of the ORX nucleic acid molecule, the encoded protein can be expressed by any recombinant technology known in the art and the activity of the protein can be determined.

In one embodiment, a mutant ORX protein can be assayed for (1) the ability to form protein:protein interactions with other ORX proteins, other cell-surface proteins, or biologically active portions thereof, (2) complex formation between a mutant ORX protein and an ORX receptor; (3) the ability of a mutant ORX protein to bind to an intracellular target protein or biologically active portion thereof; (*e.g.*, avidin proteins); (4) the ability to bind ORX protein; or (5) the ability to specifically bind an anti-ORX protein antibody.

Antisense ORX Nucleic Acids

Another aspect of the invention pertains to isolated antisense nucleic acid molecules that are hybridizable to or complementary to the nucleic acid molecule comprising the nucleotide sequence of the ORX nucleic acid molecule, or fragments, analogs or derivatives thereof. An "antisense" nucleic acid comprises a nucleotide sequence that is complementary to a "sense" nucleic acid encoding a protein, *e.g.*, complementary to the coding strand of a double-stranded cDNA molecule or complementary to an mRNA sequence. In specific aspects, antisense nucleic acid molecules are provided that comprise a sequence complementary to at least about 10, 25, 50, 100, 250 or 500 nucleotides or an entire ORX coding strand, or to only a portion thereof. Nucleic acid molecules encoding fragments, homologs, derivatives and analogs of an ORX protein or antisense nucleic acids complementary to an ORX nucleic acid sequence of GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843 are additionally provided.

In one embodiment, an antisense nucleic acid molecule is antisense to a "coding region" of the coding strand of a nucleotide sequence encoding ORX. The term "coding region" refers to the region of the nucleotide sequence comprising codons which are translated into amino acid residues. In another embodiment, the antisense nucleic acid molecule is antisense to a "noncoding region" of the coding strand of a nucleotide sequence encoding ORX. The term "noncoding region" refers to 5' and 3' sequences which flank the coding region that are not translated into amino acids (*i.e.*, also referred to as 5' and 3' untranslated regions).

Given the coding strand sequences encoding ORX disclosed herein, antisense nucleic acids of the invention can be designed according to the rules of Watson and Crick or Hoogsteen base pairing. The antisense nucleic acid molecule can be complementary to the entire coding region of ORX mRNA, but more preferably is an oligonucleotide that is antisense to only a

portion of the coding or noncoding region of ORX mRNA. For example, the antisense oligonucleotide can be complementary to the region surrounding the translation start site of ORX mRNA. An antisense oligonucleotide can be, for example, about 5, 10, 15, 20, 25, 30, 35, 40, 45 or 50 nucleotides in length. An antisense nucleic acid of the invention can be constructed using chemical synthesis or enzymatic ligation reactions using procedures known in the art. For example, an antisense nucleic acid (*e.g.*, an antisense oligonucleotide) can be chemically synthesized using naturally occurring nucleotides or variously modified nucleotides designed to increase the biological stability of the molecules or to increase the physical stability of the duplex formed between the antisense and sense nucleic acids, *e.g.*, phosphorothioate derivatives and acridine substituted nucleotides can be used.

Examples of modified nucleotides that can be used to generate the antisense nucleic acid include: 5-fluorouracil, 5-bromouracil, 5-chlorouracil, 5-iodouracil, hypoxanthine, xanthine, 4-acetylcytosine, 5-(carboxyhydroxylmethyl) uracil, 5-carboxymethylaminomethyl-2-thiouridine, 5-carboxymethylaminomethyluracil, dihydrouracil, beta-D-galactosylqueosine, inosine, N6-isopentenyladenine, 1-methylguanine, 1-methylinosine, 2,2-dimethylguanine, 2-methyladenine, 2-methylguanine, 3-methylcytosine, 5-methylcytosine, N6-adenine, 7-methylguanine, 5-methylaminomethyluracil, 5-methoxyaminomethyl-2-thiouracil, beta-D-mannosylqueosine, 5'-methoxycarboxymethyluracil, 5-methoxyuracil, 2-methylthio-N6-isopentenyladenine, uracil-5-oxyacetic acid (v), wybutoxosine, pseudouracil, queosine, 2-thiocytosine, 5-methyl-2-thiouracil, 2-thiouracil, 4-thiouracil, 5-methyluracil, uracil-5-oxyacetic acid methylester, uracil-5-oxyacetic acid (v), 5-methyl-2-thiouracil, 3-(3-amino-3-N-2-carboxypropyl) uracil, (acp3)w, and 2,6-diaminopurine. Alternatively, the antisense nucleic acid can be produced biologically using an expression vector into which a nucleic acid has been subcloned in an antisense orientation (*i.e.*, RNA transcribed from the inserted nucleic acid will be of an antisense orientation to a target nucleic acid of interest, described further in the following subsection).

The antisense nucleic acid molecules of the invention are typically administered to a subject or generated *in situ* such that they hybridize with or bind to cellular mRNA and/or genomic DNA encoding an ORX protein to thereby inhibit expression of the protein, *e.g.*, by inhibiting transcription and/or translation. The hybridization can be by conventional nucleotide complementarity to form a stable duplex, or, for example, in the case of an antisense nucleic acid

molecule that binds to DNA duplexes, through specific interactions in the major groove of the double helix. An example of a route of administration of antisense nucleic acid molecules of the invention includes direct injection at a tissue site. Alternatively, antisense nucleic acid molecules can be modified to target selected cells and then administered systemically. For example, for systemic administration, antisense molecules can be modified such that they specifically bind to receptors or antigens expressed on a selected cell surface, *e.g.*, by linking the antisense nucleic acid molecules to peptides or antibodies that bind to cell surface receptors or antigens. The antisense nucleic acid molecules can also be delivered to cells using the vectors described herein. To achieve sufficient intracellular concentrations of antisense molecules, vector constructs in which the antisense nucleic acid molecule is placed under the control of a strong pol II or pol III promoter are preferred.

In yet another embodiment, the antisense nucleic acid molecule of the invention is an α-anomeric nucleic acid molecule. An α-anomeric nucleic acid molecule forms specific double-stranded hybrids with complementary RNA in which, contrary to the usual β-units, the strands run parallel to each other (Gaultier *et al.* (1987) *Nucleic Acids Res* 15: 6625-6641). The antisense nucleic acid molecule can also comprise a 2'-o-methylribonucleotide (Inoue *et al.* (1987) *Nucleic Acids Res* 15: 6131-6148) or a chimeric RNA -DNA analogue (Inoue *et al.* (1987) *FEBS Lett* 215: 327-330).

Such modifications include, by way of nonlimiting example, modified bases, and nucleic acids whose sugar phosphate backbones are modified or derivatized. These modifications are carried out at least in part to enhance the chemical stability of the modified nucleic acid, such that they may be used, for example, as antisense binding nucleic acids in therapeutic applications in a subject.

ORX Ribozymes and PNA moieties

In still another embodiment, an antisense nucleic acid of the invention is a ribozyme. Ribozymes are catalytic RNA molecules with ribonuclease activity that are capable of cleaving a single-stranded nucleic acid, such as a mRNA, to which they have a complementary region. Thus, ribozymes (*e.g.*, hammerhead ribozymes (described in Haselhoff and Gerlach (1988) *Nature* 334:585-591)) can be used to catalytically cleave ORX mRNA transcripts to thereby inhibit translation of ORX mRNA. A ribozyme having specificity for an ORX-encoding nucleic

acid can be designed based upon the nucleotide sequence of an ORX DNA disclosed herein. For example, a derivative of a Tetrahymena L-19 IVS RNA can be constructed in which the nucleotide sequence of the active site is complementary to the nucleotide sequence to be cleaved in an ORX-encoding mRNA. See, *e.g.*, Cech *et al.* U.S. Pat. No. 4,987,071; and Cech *et al.* U.S. Pat. No. 5,116,742. Alternatively, ORX mRNA can be used to select a catalytic RNA having a specific ribonuclease activity from a pool of RNA molecules. See, *e.g.*, Bartel *et al.*, (1993) *Science* 261:1411-1418.

Alternatively, ORX gene expression can be inhibited by targeting nucleotide sequences complementary to the regulatory region of the ORX (*e.g.*, the ORX promoter and/or enhancers) to form triple helical structures that prevent transcription of the ORX gene in target cells. See generally, Helene. (1991) *Anticancer Drug Des.* 6: 569-84; Helene. *et al.* (1992) *Ann. N.Y. Acad. Sci.* 660:27-36; and Maher (1992) *Bioassays* 14: 807-15.

In various embodiments, the nucleic acids of ORX can be modified at the base moiety, sugar moiety or phosphate backbone to improve, *e.g.*, the stability, hybridization, or solubility of the molecule. For example, the deoxyribose phosphate backbone of the nucleic acids can be modified to generate peptide nucleic acids (see Hyrup *et al.* (1996) *Bioorg Med Chem* 4: 5-23). As used herein, the terms "peptide nucleic acids" or "PNAs" refer to nucleic acid mimics, *e.g.*, DNA mimics, in which the deoxyribose phosphate backbone is replaced by a pseudopeptide backbone and only the four natural nucleobases are retained. The neutral backbone of PNAs has been shown to allow for specific hybridization to DNA and RNA under conditions of low ionic strength. The synthesis of PNA oligomers can be performed using standard solid phase peptide synthesis protocols as described in Hyrup *et al.* (1996) above; Perry-O'Keefe *et al.* (1996) *PNAS* 93: 14670-675.

PNAs of ORX can be used in therapeutic and diagnostic applications. For example, PNAs can be used as antisense or antigene agents for sequence-specific modulation of gene expression by, *e.g.*, inducing transcription or translation arrest or inhibiting replication. PNAs of ORX can also be used, *e.g.*, in the analysis of single base pair mutations in a gene by, *e.g.*, PNA directed PCR clamping; as artificial restriction enzymes when used in combination with other enzymes, *e.g.*, S1 nucleases (Hyrup B. (1996) above); or as probes or primers for DNA sequence and hybridization (Hyrup *et al.* (1996), above; Perry-O'Keefe (1996), above).

In another embodiment, PNAs of ORX can be modified, *e.g.*, to enhance their stability or cellular uptake, by attaching lipophilic or other helper groups to PNA, by the formation of PNA-DNA chimeras, or by the use of liposomes or other techniques of drug delivery known in the art. For example, PNA-DNA chimeras of ORX can be generated that may combine the advantageous properties of PNA and DNA. Such chimeras allow DNA recognition enzymes, *e.g.*, RNase H and DNA polymerases, to interact with the DNA portion while the PNA portion would provide high binding affinity and specificity. PNA-DNA chimeras can be linked using linkers of appropriate lengths selected in terms of base stacking, number of bonds between the nucleobases, and orientation (Hyrup (1996) above). The synthesis of PNA-DNA chimeras can be performed as described in Hyrup (1996) above and Finn *et al.* (1996) *Nucl Acids Res* 24: 3357-63. For example, a DNA chain can be synthesized on a solid support using standard phosphoramidite coupling chemistry, and modified nucleoside analogs, *e.g.*, 5'-(4-methoxytrityl) amino-5'-deoxy-thymidine phosphoramidite, can be used between the PNA and the 5' end of DNA (Mag *et al.* (1989) *Nucl Acid Res* 17: 5973-88). PNA monomers are then coupled in a stepwise manner to produce a chimeric molecule with a 5' PNA segment and a 3' DNA segment (Finn *et al.* (1996) above). Alternatively, chimeric molecules can be synthesized with a 5' DNA segment and a 3' PNA segment. See, Petersen *et al.* (1975) *Bioorg Med Chem Lett* 5: 1119-11124.

In other embodiments, the oligonucleotide may include other appended groups such as peptides (*e.g.*, for targeting host cell receptors *in vivo*), or agents facilitating transport across the cell membrane (see, *e.g.*, Letsinger *et al.*, 1989, *Proc. Natl. Acad. Sci. U.S.A.* 86:6553-6556; Lemaitre *et al.*, 1987, Proc. *Natl. Acad. Sci.* 84:648-652; PCT Publication No. W088/09810) or the blood-brain barrier (see, *e.g.*, PCT Publication No. W089/10134). In addition, oligonucleotides can be modified with hybridization triggered cleavage agents (See, *e.g.*, Krol *et al.*, 1988, *BioTechniques* 6:958-976) or intercalating agents. (See, *e.g.*, Zon, 1988, *Pharm. Res.* 5: 539-549). To this end, the oligonucleotide may be conjugated to another molecule, *e.g.*, a peptide, a hybridization triggered cross-linking agent, a transport agent, a hybridization-triggered cleavage agent, etc.

ORX Polypeptides

An ORX polypeptide of the invention includes the ORX-like protein whose sequence is provided in GenBank Accession Nos. AF127814, AF127816-127819, AF127821-127824, AF127836-127837, AF127840, AF127845-127848, AF127851-127852, AF127857, AF127859, AF127861-127862, AF127865, AF127867-127868, AF127870-127872, AF127874-127884, AF127886, AF127888, AF127896-127904, AF127906-127907, AF179716-179717, AF179720-179728, AF179730-179737, AF179739-179746, AF179748-179750, AF179752, AF179755-179756, AF179758-179761, AF179766-179767, AF179770-179771, AF179773-179775, AF179777-179779, AF179784-179788, AF179790-179792, AF179794, AF179796-179799, AF179802-179811, AF179814, AF179816-179818, AF179820, AF179822-179832, AF179834-179839, AF179841-179843, and AF073959-073989. The invention also includes a mutant or variant protein any of whose residues may be changed from the corresponding residue of the ORX polypeptide while still encoding a protein that maintains its ORX-like activities and physiological functions, or a functional fragment thereof. In some embodiments, up to 20% or more of the residues may be so changed in the mutant or variant protein. In some embodiments, the ORX polypeptide according to the invention is a mature polypeptide.

In general, an ORX -like variant that preserves ORX-like function includes any variant in which residues at a particular position in the sequence have been substituted by other amino acids, and further include the possibility of inserting an additional residue or residues between two residues of the parent protein as well as the possibility of deleting one or more residues from the parent sequence. Any amino acid substitution, insertion, or deletion is encompassed by the invention. In favorable circumstances, the substitution is a conservative substitution as defined above.

One aspect of the invention pertains to isolated ORX proteins, and biologically active portions thereof, or derivatives, fragments, analogs or homologs thereof. Also provided are polypeptide fragments suitable for use as immunogens to raise anti-ORX antibodies. In one embodiment, native ORX proteins can be isolated from cells or tissue sources by an appropriate purification scheme using standard protein purification techniques. In another embodiment, ORX proteins are produced by recombinant DNA techniques. Alternative to recombinant expression, an ORX protein or polypeptide can be synthesized chemically using standard peptide synthesis techniques.

An "isolated" or "purified" protein or biologically active portion thereof is substantially free of cellular material or other contaminating proteins from the cell or tissue source from which the ORX protein is derived, or substantially free from chemical precursors or other chemicals when chemically synthesized. The language "substantially free of cellular material" includes preparations of ORX protein in which the protein is separated from cellular components of the cells from which it is isolated or recombinantly produced. In one embodiment, the language "substantially free of cellular material" includes preparations of ORX protein having less than about 30% (by dry weight) of non-ORX protein (also referred to herein as a "contaminating protein"), more preferably less than about 20% of non-ORX protein, still more preferably less than about 10% of non-ORX protein, and most preferably less than about 5% non-ORX protein. When the ORX protein or biologically active portion thereof is recombinantly produced, it is also preferably substantially free of culture medium, *i.e.*, culture medium represents less than about 20%, more preferably less than about 10%, and most preferably less than about 5% of the volume of the protein preparation.

The language "substantially free of chemical precursors or other chemicals" includes preparations of ORX protein in which the protein is separated from chemical precursors or other chemicals that are involved in the synthesis of the protein. In one embodiment, the language "substantially free of chemical precursors or other chemicals" includes preparations of ORX protein having less than about 30% (by dry weight) of chemical precursors or non-ORX chemicals, more preferably less than about 20% chemical precursors or non-ORX chemicals, still more preferably less than about 10% chemical precursors or non-ORX chemicals, and most preferably less than about 5% chemical precursors or non-ORX chemicals.

Biologically active portions of an ORX protein include peptides comprising amino acid sequences sufficiently homologous to or derived from the amino acid sequence of the ORX protein, *e.g.*, the amino acid sequence of the ORX polypeptides that include fewer amino acids than the full length ORX proteins, and exhibit at least one activity of an ORX protein. Typically, biologically active portions comprise a domain or motif with at least one activity of the ORX protein. A biologically active portion of an ORX protein can be a polypeptide which is, for example, 10, 25, 50, 100 or more amino acids in length.

In some embodiments, an ORX protein of the invention includes the amino acid sequence of the herein described polypeptide and a number of amino acids on the amino terminus of the

ORX protein, the carboxy terminus if the ORX protein, or a number of amino acids on both termni of the disclosed ORX protein. Thus, the ORX protein can include 1, 2, 3, 4, 5, 10, 15, 20, 25, 50, or 75 or more amino acids on the amino terminus, the carboxy terminus, or both termini of the disclosed amino acid sequence.

A biologically active portion of an ORX protein of the present invention may contain at least one of the above-identified domains conserved between the ORX proteins, *e.g.* TSR modules. Moreover, other biologically active portions, in which other regions of the protein are deleted, can be prepared by recombinant techniques and evaluated for one or more of the functional activities of a native ORX protein.

In an embodiment, the ORX protein has an amino acid sequence of an ORX polypeptides. In other embodiments, the ORX protein is substantially homologous to an ORX polypeptide and retains the functional activity of the ORX polypeptide yet differs in amino acid sequence due to natural allelic variation or mutagenesis, as described in detail below. Accordingly, in another embodiment, the ORX protein is a protein that comprises an amino acid sequence at least about 45% homologous to the amino acid sequence of an ORX polypeptide and retains the functional activity of the ORX polypeptides.

Determining homology between two or more sequence

To determine the percent homology of two amino acid sequences or of two nucleic acids, the sequences are aligned for optimal comparison purposes (*e.g.*, gaps can be introduced in either of the sequences being compared for optimal alignment between the sequences). The amino acid residues or nucleotides at corresponding amino acid positions or nucleotide positions are then compared. When a position in the first sequence is occupied by the same amino acid residue or nucleotide as the corresponding position in the second sequence, then the molecules are homologous at that position (*i.e.*, as used herein amino acid or nucleic acid "homology" is equivalent to amino acid or nucleic acid "identity").

The nucleic acid sequence homology may be determined as the degree of identity between two sequences. The homology may be determined using computer programs known in the art, such as GAP software provided in the GCG program package. See, *Needleman and Wunsch* 1970 *J Mol Biol* 48: 443-453. Using GCG GAP software with the following settings for nucleic acid sequence comparison: GAP creation penalty of 5.0 and GAP extension penalty of 0.3, the

coding region of the analogous nucleic acid sequences referred to above exhibits a degree of identity preferably of at least 70%, 75%, 80%, 85%, 90%, 95%, 98%, or 99%, with the CDS (encoding) part of the DNA sequence shown in GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843.

The term "sequence identity" refers to the degree to which two polynucleotide or polypeptide sequences are identical on a residue-by-residue basis over a particular region of comparison. The term "percentage of sequence identity" is calculated by comparing two optimally aligned sequences over that region of comparison, determining the number of positions at which the identical nucleic acid base (*e.g.*, A, T, C, G, U, or I, in the case of nucleic acids) occurs in both sequences to yield the number of matched positions, dividing the number of matched positions by the total number of positions in the region of comparison (*i.e.*, the window size), and multiplying the result by 100 to yield the percentage of sequence identity. The term "substantial identity" as used herein denotes a characteristic of a polynucleotide sequence, wherein the polynucleotide comprises a sequence that has at least 80 percent sequence identity, preferably at least 85 percent identity and often 90 to 95 percent sequence identity, more usually at least 99 percent sequence identity as compared to a reference sequence over a comparison region. The term "percentage of positive residues" is calculated by comparing two optimally aligned sequences over that region of comparison, determining the number of positions at which the identical and conservative amino acid substitutions, as defined above, occur in both sequences to yield the number of matched positions, dividing the number of matched positions by the total number of positions in the region of comparison (*i.e.*, the window size), and multiplying the result by 100 to yield the percentage of positive residues.

Chimeric and fusion proteins

The invention also provides ORX chimeric or fusion proteins. As used herein, an ORX "chimeric protein" or "fusion protein" comprises an ORX polypeptide operatively linked to a non-ORX polypeptide. An "ORX polypeptide" refers to a polypeptide having an amino acid sequence corresponding to ORX, whereas a "non-ORX polypeptide" refers to a polypeptide having an amino acid sequence corresponding to a protein that is not substantially homologous to the ORX protein, *e.g.*, a protein that is different from the ORX protein and that is derived from the same or a different organism. Within an ORX fusion protein the ORX polypeptide can

correspond to all or a portion of an ORX protein. In one embodiment, an ORX fusion protein comprises at least one biologically active portion of an ORX protein. In another embodiment, an ORX fusion protein comprises at least two biologically active portions of an ORX protein. Within the fusion protein, the term "operatively linked" is intended to indicate that the ORX polypeptide and the non-ORX polypeptide are fused in-frame to each other. The non-ORX polypeptide can be fused to the N-terminus or C-terminus of the ORX polypeptide.

For example, in one embodiment an ORX fusion protein comprises an ORX polypeptide operably linked to the extracellular domain of a second protein. Such fusion proteins can be further utilized in screening assays for compounds that modulate ORX activity (such assays are described in detail below).

In another embodiment, the fusion protein is a GST-ORX fusion protein in which the ORX sequences are fused to the C-terminus of the GST (*i.e.*, glutathione S-transferase) sequences. Such fusion proteins can facilitate the purification of recombinant ORX.

In another embodiment, the fusion protein is an ORX-immunoglobulin fusion protein in which the ORX sequences comprising one or more domains are fused to sequences derived from a member of the immunoglobulin protein family. The ORX-immunoglobulin fusion proteins of the invention can be incorporated into pharmaceutical compositions and administered to a subject to inhibit an interaction between an ORX ligand and an ORX protein on the surface of a cell, to thereby suppress ORX-mediated signal transduction *in vivo*. In one nonlimiting example, a contemplated ORX ligand of the invention is the ORX receptor. The ORX-immunoglobulin fusion proteins can be used to affect the bioavailability of an ORX cognate ligand. Inhibition of the ORX ligand/ORX interaction may be useful therapeutically for both the treatment of proliferative and differentiative disorders, *e,g.,* cancer as well as modulating (*e.g.*, promoting or inhibiting) cell survival. Moreover, the ORX-immunoglobulin fusion proteins of the invention can be used as immunogens to produce anti-ORX antibodies in a subject, to purify ORX ligands, and in screening assays to identify molecules that inhibit the interaction of ORX with an ORX ligand.

An ORX chimeric or fusion protein of the invention can be produced by standard recombinant DNA techniques. For example, DNA fragments coding for the different polypeptide sequences are ligated together in-frame in accordance with conventional techniques, *e.g.*, by employing blunt-ended or stagger-ended termini for ligation, restriction enzyme digestion

to provide for appropriate termini, filling-in of cohesive ends as appropriate, alkaline phosphatase treatment to avoid undesirable joining, and enzymatic ligation. In another embodiment, the fusion gene can be synthesized by conventional techniques including automated DNA synthesizers. Alternatively, PCR amplification of gene fragments can be carried out using anchor primers that give rise to complementary overhangs between two consecutive gene fragments that can subsequently be annealed and reamplified to generate a chimeric gene sequence (see, for example, Ausubel et al. (eds.) CURRENT PROTOCOLS IN MOLECULAR BIOLOGY, John Wiley & Sons, 1992). Moreover, many expression vectors are commercially available that already encode a fusion moiety (*e.g.*, a GST polypeptide). An ORX-encoding nucleic acid can be cloned into such an expression vector such that the fusion moiety is linked in-frame to the ORX protein.

ORX agonists and antagonists

The present invention also pertains to variants of the ORX proteins that function as either ORX agonists (mimetics) or as ORX antagonists. Variants of the ORX protein can be generated by mutagenesis, *e.g.*, discrete point mutation or truncation of the ORX protein. An agonist of the ORX protein can retain substantially the same, or a subset of, the biological activities of the naturally occurring form of the ORX protein. An antagonist of the ORX protein can inhibit one or more of the activities of the naturally occurring form of the ORX protein by, for example, competitively binding to a downstream or upstream member of a cellular signaling cascade which includes the ORX protein. Thus, specific biological effects can be elicited by treatment with a variant of limited function. In one embodiment, treatment of a subject with a variant having a subset of the biological activities of the naturally occurring form of the protein has fewer side effects in a subject relative to treatment with the naturally occurring form of the ORX proteins.

Variants of the ORX protein that function as either ORX agonists (mimetics) or as ORX antagonists can be identified by screening combinatorial libraries of mutants, *e.g.*, truncation mutants, of the ORX protein for ORX protein agonist or antagonist activity. In one embodiment, a variegated library of ORX variants is generated by combinatorial mutagenesis at the nucleic acid level and is encoded by a variegated gene library. A variegated library of ORX variants can be produced by, for example, enzymatically ligating a mixture of synthetic oligonucleotides into

gene sequences such that a degenerate set of potential ORX sequences is expressible as individual polypeptides, or alternatively, as a set of larger fusion proteins (*e.g.*, for phage display) containing the set of ORX sequences therein. There are a variety of methods which can be used to produce libraries of potential ORX variants from a degenerate oligonucleotide sequence. Chemical synthesis of a degenerate gene sequence can be performed in an automatic DNA synthesizer, and the synthetic gene then ligated into an appropriate expression vector. Use of a degenerate set of genes allows for the provision, in one mixture, of all of the sequences encoding the desired set of potential ORX sequences. Methods for synthesizing degenerate oligonucleotides are known in the art (see, *e.g.*, Narang (1983) *Tetrahedron* 39:3; Itakura *et al.* (1984) *Annu Rev Biochem* 53:323; Itakura *et al.* (1984) *Science* 198:1056; Ike *et al.* (1983) *Nucl Acid Res* 11:477.

Polypeptide libraries

In addition, libraries of fragments of the ORX protein coding sequence can be used to generate a variegated population of ORX fragments for screening and subsequent selection of variants of an ORX protein. In one embodiment, a library of coding sequence fragments can be generated by treating a double stranded PCR fragment of an ORX coding sequence with a nuclease under conditions wherein nicking occurs only about once per molecule, denaturing the double stranded DNA, renaturing the DNA to form double stranded DNA that can include sense/antisense pairs from different nicked products, removing single stranded portions from reformed duplexes by treatment with S1 nuclease, and ligating the resulting fragment library into an expression vector. By this method, an expression library can be derived which encodes N-terminal and internal fragments of various sizes of the ORX protein.

Several techniques are known in the art for screening gene products of combinatorial libraries made by point mutations or truncation, and for screening cDNA libraries for gene products having a selected property. Such techniques are adaptable for rapid screening of the gene libraries generated by the combinatorial mutagenesis of ORX proteins. The most widely used techniques, which are amenable to high throughput analysis, for screening large gene libraries typically include cloning the gene library into replicable expression vectors, transforming appropriate cells with the resulting library of vectors, and expressing the combinatorial genes under conditions in which detection of a desired activity facilitates isolation

of the vector encoding the gene whose product was detected. Recrusive ensemble mutagenesis (REM), a new technique that enhances the frequency of functional mutants in the libraries, can be used in combination with the screening assays to identify ORX variants (Arkin and Yourvan (1992) PNAS 89:7811-7815; Delgrave *et al.* (1993) Protein Engineering 6:327-331).

ORX Antibodies

Also included in the invention are antibodies to ORX proteins, or fragments of ORX proteins. The term "antibody" as used herein refers to immunoglobulin molecules and immunologically active portions of immunoglobulin (Ig) molecules, *i.e.*, molecules that contain an antigen binding site that specifically binds (immunoreacts with) an antigen. Such antibodies include, but are not limited to, polyclonal, monoclonal, chimeric, single chain, F_{ab}, $F_{ab'}$ and $F_{(ab')2}$ fragments, and an F_{ab} expression library. In general, an antibody molecule obtained from humans relates to any of the classes IgG, IgM, IgA, IgE and IgD, which differ from one another by the nature of the heavy chain present in the molecule. Certain classes have subclasses as well, such as IgG_1, IgG_2, and others. Furthermore, in humans, the light chain may be a kappa chain or a lambda chain. Reference herein to antibodies includes a reference to all such classes, subclasses and types of human antibody species.

An isolated ORX-related protein of the invention may be intended to serve as an antigen, or a portion or fragment thereof, and additionally can be used as an immunogen to generate antibodies that immunospecifically bind the antigen, using standard techniques for polyclonal and monoclonal antibody preparation. The full-length protein can be used or, alternatively, the invention provides antigenic peptide fragments of the antigen for use as immunogens. An antigenic peptide fragment comprises at least 6 amino acid residues of the amino acid sequence of the full length protein and encompasses an epitope thereof such that an antibody raised against the peptide forms a specific immune complex with the full length protein or with any fragment that contains the epitope. Preferably, the antigenic peptide comprises at least 10 amino acid residues, or at least 15 amino acid residues, or at least 20 amino acid residues, or at least 30 amino acid residues. Preferred epitopes encompassed by the antigenic peptide are regions of the protein that are located on its surface; commonly these are hydrophilic regions.

In certain embodiments of the invention, at least one epitope encompassed by the antigenic peptide is a region of ORX-related protein that is located on the surface of the protein,

e.g., a hydrophilic region. A hydrophobicity analysis of the human ORX-related protein sequence will indicate which regions of an ORX-related protein are particularly hydrophilic and, therefore, are likely to encode surface residues useful for targeting antibody production. As a means for targeting antibody production, hydropathy plots showing regions of hydrophilicity and hydrophobicity may be generated by any method well known in the art, including, for example, the Kyte Doolittle or the Hopp Woods methods, either with or without Fourier transformation. See, *e.g.*, Hopp and Woods, 1981, *Proc. Nat. Acad. Sci. USA* 78: 3824-3828; Kyte and Doolittle 1982, *J. Mol. Biol.* 157: 105-142, each of which is incorporated herein by reference in its entirety. Antibodies that are specific for one or more domains within an antigenic protein, or derivatives, fragments, analogs or homologs thereof, are also provided herein.

A protein of the invention, or a derivative, fragment, analog, homolog or ortholog thereof, may be utilized as an immunogen in the generation of antibodies that immunospecifically bind these protein components.

Various procedures known within the art may be used for the production of polyclonal or monoclonal antibodies directed against a protein of the invention, or against derivatives, fragments, analogs homologs or orthologs thereof (see, for example, Antibodies: A Laboratory Manual, Harlow E, and Lane D, 1988, Cold Spring Harbor Laboratory Press, Cold Spring Harbor, NY, incorporated herein by reference). Some of these antibodies are discussed below.

Polyclonal Antibodies

For the production of polyclonal antibodies, various suitable host animals (*e.g.*, rabbit, goat, mouse or other mammal) may be immunized by one or more injections with the native protein, a synthetic variant thereof, or a derivative of the foregoing. An appropriate immunogenic preparation can contain, for example, the naturally occurring immunogenic protein, a chemically synthesized polypeptide representing the immunogenic protein, or a recombinantly expressed immunogenic protein. Furthermore, the protein may be conjugated to a second protein known to be immunogenic in the mammal being immunized. Examples of such immunogenic proteins include but are not limited to keyhole limpet hemocyanin, serum albumin, bovine thyroglobulin, and soybean trypsin inhibitor. The preparation can further include an adjuvant. Various adjuvants used to increase the immunological response include, but are not limited to, Freund's (complete and incomplete), mineral gels (*e.g.*, aluminum hydroxide), surface

active substances (*e.g.*, lysolecithin, pluronic polyols, polyanions, peptides, oil emulsions, dinitrophenol, etc.), adjuvants usable in humans such as Bacille Calmette-Guerin and Corynebacterium parvum, or similar immunostimulatory agents. Additional examples of adjuvants which can be employed include MPL-TDM adjuvant (monophosphoryl Lipid A, synthetic trehalose dicorynomycolate).

The polyclonal antibody molecules directed against the immunogenic protein can be isolated from the mammal (*e.g.*, from the blood) and further purified by well known techniques, such as affinity chromatography using protein A or protein G, which provide primarily the IgG fraction of immune serum. Subsequently, or alternatively, the specific antigen which is the target of the immunoglobulin sought, or an epitope thereof, may be immobilized on a column to purify the immune specific antibody by immunoaffinity chromatography. Purification of immunoglobulins is discussed, for example, by D. Wilkinson (The Scientist, published by The Scientist, Inc., Philadelphia PA, Vol. 14, No. 8 (April 17, 2000), pp. 25-28).

Monoclonal Antibodies

The term "monoclonal antibody" (MAb) or "monoclonal antibody composition", as used herein, refers to a population of antibody molecules that contain only one molecular species of antibody molecule consisting of a unique light chain gene product and a unique heavy chain gene product. In particular, the complementarity determining regions (CDRs) of the monoclonal antibody are identical in all the molecules of the population. MAbs thus contain an antigen binding site capable of immunoreacting with a particular epitope of the antigen characterized by a unique binding affinity for it.

Monoclonal antibodies can be prepared using hybridoma methods, such as those described by Kohler and Milstein, Nature, 256:495 (1975). In a hybridoma method, a mouse, hamster, or other appropriate host animal, is typically immunized with an immunizing agent to elicit lymphocytes that produce or are capable of producing antibodies that will specifically bind to the immunizing agent. Alternatively, the lymphocytes can be immunized *in vitro*.

The immunizing agent will typically include the protein antigen, a fragment thereof or a fusion protein thereof. Generally, either peripheral blood lymphocytes are used if cells of human origin are desired, or spleen cells or lymph node cells are used if non-human mammalian sources are desired. The lymphocytes are then fused with an immortalized cell line using a suitable

fusing agent, such as polyethylene glycol, to form a hybridoma cell (Goding, Monoclonal Antibodies: Principles and Practice, Academic Press, (1986) pp. 59-103). Immortalized cell lines are usually transformed mammalian cells, particularly myeloma cells of rodent, bovine and human origin. Usually, rat or mouse myeloma cell lines are employed. The hybridoma cells can be cultured in a suitable culture medium that preferably contains one or more substances that inhibit the growth or survival of the unfused, immortalized cells. For example, if the parental cells lack the enzyme hypoxanthine guanine phosphoribosyl transferase (HGPRT or HPRT), the culture medium for the hybridomas typically will include hypoxanthine, aminopterin, and thymidine ("HAT medium"), which substances prevent the growth of HGPRT-deficient cells.

Preferred immortalized cell lines are those that fuse efficiently, support stable high level expression of antibody by the selected antibody-producing cells, and are sensitive to a medium such as HAT medium. More preferred immortalized cell lines are murine myeloma lines, which can be obtained, for instance, from the Salk Institute Cell Distribution Center, San Diego, California and the American Type Culture Collection, Manassas, Virginia. Human myeloma and mouse-human heteromyeloma cell lines also have been described for the production of human monoclonal antibodies (Kozbor, J. Immunol., 133:3001 (1984); Brodeur et al., Monoclonal Antibody Production Techniques and Applications, Marcel Dekker, Inc., New York, (1987) pp. 51-63).

The culture medium in which the hybridoma cells are cultured can then be assayed for the presence of monoclonal antibodies directed against the antigen. Preferably, the binding specificity of monoclonal antibodies produced by the hybridoma cells is determined by immunoprecipitation or by an *in vitro* binding assay, such as radioimmunoassay (RIA) or enzyme-linked immunoabsorbent assay (ELISA). Such techniques and assays are known in the art. The binding affinity of the monoclonal antibody can, for example, be determined by the Scatchard analysis of Munson and Pollard, Anal. Biochem., 107:220 (1980). Preferably, antibodies having a high degree of specificity and a high binding affinity for the target antigen are isolated.

After the desired hybridoma cells are identified, the clones can be subcloned by limiting dilution procedures and grown by standard methods. Suitable culture media for this purpose include, for example, Dulbecco's Modified Eagle's Medium and RPMI-1640 medium. Alternatively, the hybridoma cells can be grown *in vivo* as ascites in a mammal.

The monoclonal antibodies secreted by the subclones can be isolated or purified from the culture medium or ascites fluid by conventional immunoglobulin purification procedures such as, for example, protein A-Sepharose, hydroxylapatite chromatography, gel electrophoresis, dialysis, or affinity chromatography.

The monoclonal antibodies can also be made by recombinant DNA methods, such as those described in U.S. Patent No. 4,816,567. DNA encoding the monoclonal antibodies of the invention can be readily isolated and sequenced using conventional procedures (*e.g.*, by using oligonucleotide probes that are capable of binding specifically to genes encoding the heavy and light chains of murine antibodies). The hybridoma cells of the invention serve as a preferred source of such DNA. Once isolated, the DNA can be placed into expression vectors, which are then transfected into host cells such as simian COS cells, Chinese hamster ovary (CHO) cells, or myeloma cells that do not otherwise produce immunoglobulin protein, to obtain the synthesis of monoclonal antibodies in the recombinant host cells. The DNA also can be modified, for example, by substituting the coding sequence for human heavy and light chain constant domains in place of the homologous murine sequences (U.S. Patent No. 4,816,567; Morrison, Nature 368, 812-13 (1994)) or by covalently joining to the immunoglobulin coding sequence all or part of the coding sequence for a non-immunoglobulin polypeptide. Such a non-immunoglobulin polypeptide can be substituted for the constant domains of an antibody of the invention, or can be substituted for the variable domains of one antigen-combining site of an antibody of the invention to create a chimeric bivalent antibody.

Humanized Antibodies

The antibodies directed against the protein antigens of the invention can further comprise humanized antibodies or human antibodies. These antibodies are suitable for administration to humans without engendering an immune response by the human against the administered immunoglobulin. Humanized forms of antibodies are chimeric immunoglobulins, immunoglobulin chains or fragments thereof (such as Fv, Fab, Fab', $F(ab')_2$ or other antigen-binding subsequences of antibodies) that are principally comprised of the sequence of a human immunoglobulin, and contain minimal sequence derived from a non-human immunoglobulin. Humanization can be performed following the method of Winter and co-workers (Jones et al., Nature, 321:522-525 (1986); Riechmann et al., Nature, 332:323-327 (1988); Verhoeyen et al.,

Science, 239:1534-1536 (1988)), by substituting rodent CDRs or CDR sequences for the corresponding sequences of a human antibody. (See also U.S. Patent No. 5,225,539.) In some instances, Fv framework residues of the human immunoglobulin are replaced by corresponding non-human residues. Humanized antibodies can also comprise residues which are found neither in the recipient antibody nor in the imported CDR or framework sequences. In general, the humanized antibody will comprise substantially all of at least one, and typically two, variable domains, in which all or substantially all of the CDR regions correspond to those of a non-human immunoglobulin and all or substantially all of the framework regions are those of a human immunoglobulin consensus sequence. The humanized antibody optimally also will comprise at least a portion of an immunoglobulin constant region (Fc), typically that of a human immunoglobulin (Jones et al., 1986; Riechmann et al., 1988; and Presta, Curr. Op. Struct. Biol., 2:593-596 (1992)).

Human Antibodies

Fully human antibodies relate to antibody molecules in which essentially the entire sequences of both the light chain and the heavy chain, including the CDRs, arise from human genes. Such antibodies are termed "human antibodies", or "fully human antibodies" herein. Human monoclonal antibodies can be prepared by the trioma technique; the human B-cell hybridoma technique (see Kozbor, et al., 1983 Immunol Today 4: 72) and the EBV hybridoma technique to produce human monoclonal antibodies (see Cole, et al., 1985 In: MONOCLONAL ANTIBODIES AND CANCER THERAPY, Alan R. Liss, Inc., pp. 77-96). Human monoclonal antibodies may be utilized in the practice of the present invention and may be produced by using human hybridomas (see Cote, et al., 1983. Proc Natl Acad Sci USA 80: 2026-2030) or by transforming human B-cells with Epstein Barr Virus *in vitro* (see Cole, et al., 1985 In: MONOCLONAL ANTIBODIES AND CANCER THERAPY, Alan R. Liss, Inc., pp. 77-96).

In addition, human antibodies can also be produced using additional techniques, including phage display libraries (Hoogenboom and Winter, J. Mol. Biol., 227:381 (1991); Marks et al., J. Mol. Biol., 222:581 (1991)). Similarly, human antibodies can be made by introducing human immunoglobulin loci into transgenic animals, *e.g.*, mice in which the endogenous immunoglobulin genes have been partially or completely inactivated. Upon challenge, human antibody production is observed, which closely resembles that seen in humans

in all respects, including gene rearrangement, assembly, and antibody repertoire. This approach is described, for example, in U.S. Patent Nos. 5,545,807; 5,545,806; 5,569,825; 5,625,126; 5,633,425; 5,661,016, and in Marks et al. (Bio/Technology 10, 779-783 (1992)); Lonberg et al. (Nature 368 856-859 (1994)); Morrison (Nature 368, 812-13 (1994)); Fishwild et al,(Nature Biotechnology 14, 845-51 (1996)); Neuberger (Nature Biotechnology 14, 826 (1996)); and Lonberg and Huszar (Intern. Rev. Immunol. 13 65-93 (1995)).

Human antibodies may additionally be produced using transgenic nonhuman animals which are modified so as to produce fully human antibodies rather than the animal's endogenous antibodies in response to challenge by an antigen. (See PCT publication WO94/02602). The endogenous genes encoding the heavy and light immunoglobulin chains in the nonhuman host have been incapacitated, and active loci encoding human heavy and light chain immunoglobulins are inserted into the host's genome. The human genes are incorporated, for example, using yeast artificial chromosomes containing the requisite human DNA segments. An animal which provides all the desired modifications is then obtained as progeny by crossbreeding intermediate transgenic animals containing fewer than the full complement of the modifications. The preferred embodiment of such a nonhuman animal is a mouse, and is termed the Xenomouse™ as disclosed in PCT publications WO 96/33735 and WO 96/34096. This animal produces B cells which secrete fully human immunoglobulins. The antibodies can be obtained directly from the animal after immunization with an immunogen of interest, as, for example, a preparation of a polyclonal antibody, or alternatively from immortalized B cells derived from the animal, such as hybridomas producing monoclonal antibodies. Additionally, the genes encoding the immunoglobulins with human variable regions can be recovered and expressed to obtain the antibodies directly, or can be further modified to obtain analogs of antibodies such as, for example, single chain Fv molecules.

An example of a method of producing a nonhuman host, exemplified as a mouse, lacking expression of an endogenous immunoglobulin heavy chain is disclosed in U.S. Patent No. 5,939,598. It can be obtained by a method including deleting the J segment genes from at least one endogenous heavy chain locus in an embryonic stem cell to prevent rearrangement of the locus and to prevent formation of a transcript of a rearranged immunoglobulin heavy chain locus, the deletion being effected by a targeting vector containing a gene encoding a selectable marker;

and producing from the embryonic stem cell a transgenic mouse whose somatic and germ cells contain the gene encoding the selectable marker.

A method for producing an antibody of interest, such as a human antibody, is disclosed in U.S. Patent No. 5,916,771. It includes introducing an expression vector that contains a nucleotide sequence encoding a heavy chain into one mammalian host cell in culture, introducing an expression vector containing a nucleotide sequence encoding a light chain into another mammalian host cell, and fusing the two cells to form a hybrid cell. The hybrid cell expresses an antibody containing the heavy chain and the light chain.

In a further improvement on this procedure, a method for identifying a clinically relevant epitope on an immunogen, and a correlative method for selecting an antibody that binds immunospecifically to the relevant epitope with high affinity, are disclosed in PCT publication WO 99/53049.

F_{ab} Fragments and Single Chain Antibodies

According to the invention, techniques can be adapted for the production of single-chain antibodies specific to an antigenic protein of the invention (see *e.g.*, U.S. Patent No. 4,946,778). In addition, methods can be adapted for the construction of F_{ab} expression libraries (see *e.g.*, Huse, et al., 1989 Science 246: 1275-1281) to allow rapid and effective identification of monoclonal F_{ab} fragments with the desired specificity for a protein or derivatives, fragments, analogs or homologs thereof. Antibody fragments that contain the idiotypes to a protein antigen may be produced by techniques known in the art including, but not limited to: (i) an $F_{(ab')2}$ fragment produced by pepsin digestion of an antibody molecule; (ii) an F_{ab} fragment generated by reducing the disulfide bridges of an $F_{(ab')2}$ fragment; (iii) an F_{ab} fragment generated by the treatment of the antibody molecule with papain and a reducing agent and (iv) F_v fragments.

Bispecific Antibodies

Bispecific antibodies are monoclonal, preferably human or humanized, antibodies that have binding specificities for at least two different antigens. In the present case, one of the binding specificities is for an antigenic protein of the invention. The second binding target is any other antigen, and advantageously is a cell-surface protein or receptor or receptor subunit.

Methods for making bispecific antibodies are known in the art. Traditionally, the recombinant production of bispecific antibodies is based on the co-expression of two immunoglobulin heavy-chain/light-chain pairs, where the two heavy chains have different specificities (Milstein and Cuello, Nature, 305:537-539 (1983)). Because of the random assortment of immunoglobulin heavy and light chains, these hybridomas (quadromas) produce a potential mixture of ten different antibody molecules, of which only one has the correct bispecific structure. The purification of the correct molecule is usually accomplished by affinity chromatography steps. Similar procedures are disclosed in WO 93/08829, published 13 May 1993, and in Traunecker *et al.*, 1991 *EMBO J.*, 10:3655-3659.

Antibody variable domains with the desired binding specificities (antibody-antigen combining sites) can be fused to immunoglobulin constant domain sequences. The fusion preferably is with an immunoglobulin heavy-chain constant domain, comprising at least part of the hinge, CH2, and CH3 regions. It is preferred to have the first heavy-chain constant region (CH1) containing the site necessary for light-chain binding present in at least one of the fusions. DNAs encoding the immunoglobulin heavy-chain fusions and, if desired, the immunoglobulin light chain, are inserted into separate expression vectors, and are co-transfected into a suitable host organism. For further details of generating bispecific antibodies see, for example, Suresh et al., Methods in Enzymology, 121:210 (1986).

According to another approach described in WO 96/27011, the interface between a pair of antibody molecules can be engineered to maximize the percentage of heterodimers which are recovered from recombinant cell culture. The preferred interface comprises at least a part of the CH3 region of an antibody constant domain. In this method, one or more small amino acid side chains from the interface of the first antibody molecule are replaced with larger side chains (*e.g.* tyrosine or tryptophan). Compensatory "cavities" of identical or similar size to the large side chain(s) are created on the interface of the second antibody molecule by replacing large amino acid side chains with smaller ones (*e.g.* alanine or threonine). This provides a mechanism for increasing the yield of the heterodimer over other unwanted end-products such as homodimers.

Bispecific antibodies can be prepared as full length antibodies or antibody fragments (*e.g.* $F(ab')_2$ bispecific antibodies). Techniques for generating bispecific antibodies from antibody fragments have been described in the literature. For example, bispecific antibodies can be prepared using chemical linkage. Brennan et al., Science 229:81 (1985) describe a procedure

wherein intact antibodies are proteolytically cleaved to generate $F(ab')_2$ fragments. These fragments are reduced in the presence of the dithiol complexing agent sodium arsenite to stabilize vicinal dithiols and prevent intermolecular disulfide formation. The Fab' fragments generated are then converted to thionitrobenzoate (TNB) derivatives. One of the Fab'-TNB derivatives is then reconverted to the Fab'-thiol by reduction with mercaptoethylamine and is mixed with an equimolar amount of the other Fab'-TNB derivative to form the bispecific antibody. The bispecific antibodies produced can be used as agents for the selective immobilization of enzymes.

Additionally, Fab' fragments can be directly recovered from E. coli and chemically coupled to form bispecific antibodies. Shalaby et al., J. Exp. Med. 175:217-225 (1992) describe the production of a fully humanized bispecific antibody $F(ab')_2$ molecule. Each Fab' fragment was separately secreted from E. coli and subjected to directed chemical coupling *in vitro* to form the bispecific antibody. The bispecific antibody thus formed was able to bind to cells overexpressing the ErbB2 receptor and normal human T cells, as well as trigger the lytic activity of human cytotoxic lymphocytes against human breast tumor targets.

Various techniques for making and isolating bispecific antibody fragments directly from recombinant cell culture have also been described. For example, bispecific antibodies have been produced using leucine zippers. Kostelny et al., J. Immunol. 148(5):1547-1553 (1992). The leucine zipper peptides from the Fos and Jun proteins were linked to the Fab' portions of two different antibodies by gene fusion. The antibody homodimers were reduced at the hinge region to form monomers and then re-oxidized to form the antibody heterodimers. This method can also be utilized for the production of antibody homodimers. The "diabody" technology described by Hollinger et al., Proc. Natl. Acad. Sci. USA 90:6444-6448 (1993) has provided an alternative mechanism for making bispecific antibody fragments. The fragments comprise a heavy-chain variable domain (V_H) connected to a light-chain variable domain (V_L) by a linker which is too short to allow pairing between the two domains on the same chain. Accordingly, the V_H and V_L domains of one fragment are forced to pair with the complementary V_L and V_H domains of another fragment, thereby forming two antigen-binding sites. Another strategy for making bispecific antibody fragments by the use of single-chain Fv (sFv) dimers has also been reported. See, Gruber et al., J. Immunol. 152:5368 (1994).

Antibodies with more than two valencies are contemplated. For example, trispecific antibodies can be prepared. Tutt et al., J. Immunol. 147:60 (1991).

Exemplary bispecific antibodies can bind to two different epitopes, at least one of which originates in the protein antigen of the invention. Alternatively, an anti-antigenic arm of an immunoglobulin molecule can be combined with an arm which binds to a triggering molecule on a leukocyte such as a T-cell receptor molecule (*e.g.* CD2, CD3, CD28, or B7), or Fc receptors for IgG (Fc?R), such as Fc?RI (CD64), Fc?RII (CD32) and Fc?RIII (CD16) so as to focus cellular defense mechanisms to the cell expressing the particular antigen. Bispecific antibodies can also be used to direct cytotoxic agents to cells which express a particular antigen. These antibodies possess an antigen-binding arm and an arm which binds a cytotoxic agent or a radionuclide chelator, such as EOTUBE, DPTA, DOTA, or TETA. Another bispecific antibody of interest binds the protein antigen described herein and further binds tissue factor (TF).

Heteroconjugate Antibodies

Heteroconjugate antibodies are also within the scope of the present invention. Heteroconjugate antibodies are composed of two covalently joined antibodies. Such antibodies have, for example, been proposed to target immune system cells to unwanted cells (U.S. Patent No. 4,676,980), and for treatment of HIV infection (WO 91/00360; WO 92/200373; EP 03089). It is contemplated that the antibodies can be prepared *in vitro* using known methods in synthetic protein chemistry, including those involving crosslinking agents. For example, immunotoxins can be constructed using a disulfide exchange reaction or by forming a thioether bond. Examples of suitable reagents for this purpose include iminothiolate and methyl-4-mercaptobutyrimidate and those disclosed, for example, in U.S. Patent No. 4,676,980.

Effector Function Engineering

It can be desirable to modify the antibody of the invention with respect to effector function, so as to enhance, *e.g.*, the effectiveness of the antibody in treating cancer. For example, cysteine residue(s) can be introduced into the Fc region, thereby allowing interchain disulfide bond formation in this region. The homodimeric antibody thus generated can have improved internalization capability and/or increased complement-mediated cell killing and antibody-dependent cellular cytotoxicity (ADCC). See Caron et al., J. Exp Med., 176: 1191-1195 (1992) and Shopes, J. Immunol., 148: 2918-2922 (1992). Homodimeric antibodies with enhanced anti-tumor activity can also be prepared using heterobifunctional cross-linkers as described in Wolff et al. Cancer Research, 53: 2560-2565 (1993). Alternatively, an antibody can be engineered that has dual Fc regions and can thereby have enhanced complement lysis and ADCC capabilities. See Stevenson et al., Anti-Cancer Drug Design, 3: 219-230 (1989).

Immunoconjugates

The invention also pertains to immunoconjugates comprising an antibody conjugated to a cytotoxic agent such as a chemotherapeutic agent, toxin (*e.g.*, an enzymatically active toxin of bacterial, fungal, plant, or animal origin, or fragments thereof), or a radioactive isotope (*i.e.*, a radioconjugate).

Chemotherapeutic agents useful in the generation of such immunoconjugates have been described above. Enzymatically active toxins and fragments thereof that can be used include diphtheria A chain, nonbinding active fragments of diphtheria toxin, exotoxin A chain (from Pseudomonas aeruginosa), ricin A chain, abrin A chain, modeccin A chain, alpha-sarcin, Aleurites fordii proteins, dianthin proteins, Phytolaca americana proteins (PAPI, PAPII, and PAP-S), momordica charantia inhibitor, curcin, crotin, sapaonaria officinalis inhibitor, gelonin, mitogellin, restrictocin, phenomycin, enomycin, and the tricothecenes. A variety of radionuclides are available for the production of radioconjugated antibodies. Examples include ^{212}Bi, ^{131}I, ^{131}In, ^{90}Y, and ^{186}Re.

Conjugates of the antibody and cytotoxic agent are made using a variety of bifunctional protein-coupling agents such as N-succinimidyl-3-(2-pyridyldithiol) propionate (SPDP), iminothiolane (IT), bifunctional derivatives of imidoesters (such as dimethyl adipimidate HCL), active esters (such as disuccinimidyl suberate), aldehydes (such as glutareldehyde), bis-azido

compounds (such as bis (p-azidobenzoyl) hexanediamine), bis-diazonium derivatives (such as bis-(p-diazoniumbenzoyl)-ethylenediamine), diisocyanates (such as tolyene 2,6-diisocyanate), and bis-active fluorine compounds (such as 1,5-difluoro-2,4-dinitrobenzene). For example, a ricin immunotoxin can be prepared as described in Vitetta et al., Science, 238: 1098 (1987). Carbon-14-labeled 1-isothiocyanatobenzyl-3-methyldiethylene triaminepentaacetic acid (MX-DTPA) is an exemplary chelating agent for conjugation of radionucleotide to the antibody. See WO94/11026.

In another embodiment, the antibody can be conjugated to a "receptor" (such streptavidin) for utilization in tumor pretargeting wherein the antibody-receptor conjugate is administered to the patient, followed by removal of unbound conjugate from the circulation using a clearing agent and then administration of a "ligand" (*e.g.*, avidin) that is in turn conjugated to a cytotoxic agent.

ORX Recombinant Expression Vectors and Host Cells

Another aspect of the invention pertains to vectors, preferably expression vectors, containing a nucleic acid encoding an ORX protein, or derivatives, fragments, analogs or homologs thereof. As used herein, the term "vector" refers to a nucleic acid molecule capable of transporting another nucleic acid to which it has been linked. One type of vector is a "plasmid", which refers to a circular double stranded DNA loop into which additional DNA segments can be ligated. Another type of vector is a viral vector, wherein additional DNA segments can be ligated into the viral genome. Certain vectors are capable of autonomous replication in a host cell into which they are introduced (*e.g.*, bacterial vectors having a bacterial origin of replication and episomal mammalian vectors). Other vectors (*e.g.*, non-episomal mammalian vectors) are integrated into the genome of a host cell upon introduction into the host cell, and thereby are replicated along with the host genome. Moreover, certain vectors are capable of directing the expression of genes to which they are operatively-linked. Such vectors are referred to herein as "expression vectors". In general, expression vectors of utility in recombinant DNA techniques are often in the form of plasmids. In the present specification, "plasmid" and "vector" can be used interchangeably as the plasmid is the most commonly used form of vector. However, the invention is intended to include such other forms of expression vectors, such as viral vectors

(*e.g.*, replication defective retroviruses, adenoviruses and adeno-associated viruses), which serve equivalent functions.

The recombinant expression vectors of the invention comprise a nucleic acid of the invention in a form suitable for expression of the nucleic acid in a host cell, which means that the recombinant expression vectors include one or more regulatory sequences, selected on the basis of the host cells to be used for expression, that is operatively-linked to the nucleic acid sequence to be expressed. Within a recombinant expression vector, "operably-linked" is intended to mean that the nucleotide sequence of interest is linked to the regulatory sequence(s) in a manner that allows for expression of the nucleotide sequence (*e.g.*, in an *in vitro* transcription/translation system or in a host cell when the vector is introduced into the host cell).

The term "regulatory sequence" is intended to includes promoters, enhancers and other expression control elements (*e.g.*, polyadenylation signals). Such regulatory sequences are described, for example, in Goeddel, GENE EXPRESSION TECHNOLOGY: METHODS IN ENZYMOLOGY 185, Academic Press, San Diego, Calif. (1990). Regulatory sequences include those that direct constitutive expression of a nucleotide sequence in many types of host cell and those that direct expression of the nucleotide sequence only in certain host cells (*e.g.*, tissue-specific regulatory sequences). It will be appreciated by those skilled in the art that the design of the expression vector can depend on such factors as the choice of the host cell to be transformed, the level of expression of protein desired, etc. The expression vectors of the invention can be introduced into host cells to thereby produce proteins or peptides, including fusion proteins or peptides, encoded by nucleic acids as described herein (*e.g.*, ORX proteins, mutant forms of ORX proteins, fusion proteins, etc.).

The recombinant expression vectors of the invention can be designed for expression of ORX proteins in prokaryotic or eukaryotic cells. For example, ORX proteins can be expressed in bacterial cells such as *Escherichia coli*, insect cells (using baculovirus expression vectors) yeast cells or mammalian cells. Suitable host cells are discussed further in Goeddel, GENE EXPRESSION TECHNOLOGY: METHODS IN ENZYMOLOGY 185, Academic Press, San Diego, Calif. (1990). Alternatively, the recombinant expression vector can be transcribed and translated *in vitro*, for example using T7 promoter regulatory sequences and T7 polymerase.

Expression of proteins in prokaryotes is most often carried out in *Escherichia coli* with vectors containing constitutive or inducible promoters directing the expression of either fusion or

non-fusion proteins. Fusion vectors add a number of amino acids to a protein encoded therein, usually to the amino terminus of the recombinant protein. Such fusion vectors typically serve three purposes: (*i*) to increase expression of recombinant protein; (*ii*) to increase the solubility of the recombinant protein; and (*iii*) to aid in the purification of the recombinant protein by acting as a ligand in affinity purification. Often, in fusion expression vectors, a proteolytic cleavage site is introduced at the junction of the fusion moiety and the recombinant protein to enable separation of the recombinant protein from the fusion moiety subsequent to purification of the fusion protein. Such enzymes, and their cognate recognition sequences, include Factor Xa, thrombin and enterokinase. Typical fusion expression vectors include pGEX (Pharmacia Biotech Inc; Smith and Johnson, 1988. *Gene* 67: 31-40), pMAL (New England Biolabs, Beverly, Mass.) and pRIT5 (Pharmacia, Piscataway, N.J.) that fuse glutathione S-transferase (GST), maltose E binding protein, or protein A, respectively, to the target recombinant protein.

Examples of suitable inducible non-fusion *E. coli* expression vectors include pTrc (Amrann *et al.*, (1988) *Gene* 69:301-315) and pET 11d (Studier *et al.*, GENE EXPRESSION TECHNOLOGY: METHODS IN ENZYMOLOGY 185, Academic Press, San Diego, Calif. (1990) 60-89).

One strategy to maximize recombinant protein expression in *E. coli* is to express the protein in a host bacteria with an impaired capacity to proteolytically cleave the recombinant protein. *See, e.g.,* Gottesman, GENE EXPRESSION TECHNOLOGY: METHODS IN ENZYMOLOGY 185, Academic Press, San Diego, Calif. (1990) 119-128. Another strategy is to alter the nucleic acid sequence of the nucleic acid to be inserted into an expression vector so that the individual codons for each amino acid are those preferentially utilized in *E. coli* (*see, e.g.,* Wada, *et al.*, 1992. *Nucl. Acids Res.* 20: 2111-2118). Such alteration of nucleic acid sequences of the invention can be carried out by standard DNA synthesis techniques.

In another embodiment, the ORX expression vector is a yeast expression vector. Examples of vectors for expression in yeast *Saccharomyces cerivisae* include pYepSec1 (Baldari, *et al.*, 1987. *EMBO J.* 6: 229-234), pMFa (Kurjan and Herskowitz, 1982. *Cell* 30: 933-943), pJRY88 (Schultz *et al.*, 1987. *Gene* 54: 113-123), pYES2 (Invitrogen Corporation, San Diego, Calif.), and picZ (InVitrogen Corp, San Diego, Calif.).

Alternatively, ORX can be expressed in insect cells using baculovirus expression vectors. Baculovirus vectors available for expression of proteins in cultured insect cells (*e.g.*, SF9 cells)

include the pAc series (Smith, *et al.*, 1983. *Mol. Cell. Biol.* 3: 2156-2165) and the pVL series (Lucklow and Summers, 1989. *Virology* 170: 31-39).

In yet another embodiment, a nucleic acid of the invention is expressed in mammalian cells using a mammalian expression vector. Examples of mammalian expression vectors include pCDM8 (Seed, 1987. *Nature* 329: 840) and pMT2PC (Kaufman, *et al.*, 1987. *EMBO J.* 6: 187-195). When used in mammalian cells, the expression vector's control functions are often provided by viral regulatory elements. For example, commonly used promoters are derived from polyoma, adenovirus 2, cytomegalovirus, and simian virus 40. For other suitable expression systems for both prokaryotic and eukaryotic cells see, *e.g.*, Chapters 16 and 17 of Sambrook, *et al.*, MOLECULAR CLONING: A LABORATORY MANUAL. 2nd ed., Cold Spring Harbor Laboratory, Cold Spring Harbor Laboratory Press, Cold Spring Harbor, N.Y., 1989.

In another embodiment, the recombinant mammalian expression vector is capable of directing expression of the nucleic acid preferentially in a particular cell type (*e.g.*, tissue-specific regulatory elements are used to express the nucleic acid). Tissue-specific regulatory elements are known in the art. Non-limiting examples of suitable tissue-specific promoters include the albumin promoter (liver-specific; Pinkert, *et al.*, 1987. *Genes Dev.* 1: 268-277), lymphoid-specific promoters (Calame and Eaton, 1988. *Adv. Immunol.* 43: 235-275), in particular promoters of T cell receptors (Winoto and Baltimore, 1989. *EMBO J.* 8: 729-733) and immunoglobulins (Banerji, *et al.*, 1983. *Cell* 33: 729-740; Queen and Baltimore, 1983. *Cell* 33: 741-748), neuron-specific promoters (*e.g.*, the neurofilament promoter; Byrne and Ruddle, 1989. *Proc. Natl. Acad. Sci. USA* 86: 5473-5477), pancreas-specific promoters (Edlund, *et al.*, 1985. *Science* 230: 912-916), and mammary gland-specific promoters (*e.g.*, milk whey promoter; U.S. Pat. No. 4,873,316 and European Application Publication No. 264,166). Developmentally-regulated promoters are also encompassed, *e.g.*, the murine hox promoters (Kessel and Gruss, 1990. *Science* 249: 374-379) and the α-fetoprotein promoter (Campes and Tilghman, 1989. *Genes Dev.* 3: 537-546).

The invention further provides a recombinant expression vector comprising a DNA molecule of the invention cloned into the expression vector in an antisense orientation. That is, the DNA molecule is operatively-linked to a regulatory sequence in a manner that allows for expression (by transcription of the DNA molecule) of an RNA molecule that is antisense to ORX mRNA. Regulatory sequences operatively linked to a nucleic acid cloned in the antisense

orientation can be chosen that direct the continuous expression of the antisense RNA molecule in a variety of cell types, for instance viral promoters and/or enhancers, or regulatory sequences can be chosen that direct constitutive, tissue specific or cell type specific expression of antisense RNA. The antisense expression vector can be in the form of a recombinant plasmid, phagemid or attenuated virus in which antisense nucleic acids are produced under the control of a high efficiency regulatory region, the activity of which can be determined by the cell type into which the vector is introduced. For a discussion of the regulation of gene expression using antisense genes *see, e.g.,* Weintraub, *et al.*, "Antisense RNA as a molecular tool for genetic analysis," *Reviews-Trends in Genetics*, Vol. 1(1) 1986.

Another aspect of the invention pertains to host cells into which a recombinant expression vector of the invention has been introduced. The terms "host cell" and "recombinant host cell" are used interchangeably herein. It is understood that such terms refer not only to the particular subject cell but also to the progeny or potential progeny of such a cell. Because certain modifications may occur in succeeding generations due to either mutation or environmental influences, such progeny may not, in fact, be identical to the parent cell, but are still included within the scope of the term as used herein.

A host cell can be any prokaryotic or eukaryotic cell. For example, ORX protein can be expressed in bacterial cells such as *E. coli*, insect cells, yeast or mammalian cells (such as human, Chinese hamster ovary cells (CHO) or COS cells). Other suitable host cells are known to those skilled in the art.

Vector DNA can be introduced into prokaryotic or eukaryotic cells via conventional transformation or transfection techniques. As used herein, the terms "transformation" and "transfection" are intended to refer to a variety of art-recognized techniques for introducing foreign nucleic acid (*e.g.*, DNA) into a host cell, including calcium phosphate or calcium chloride co-precipitation, DEAE-dextran-mediated transfection, lipofection, or electroporation. Suitable methods for transforming or transfecting host cells can be found in Sambrook, *et al.* (MOLECULAR CLONING: A LABORATORY MANUAL. 2nd ed., Cold Spring Harbor Laboratory, Cold Spring Harbor Laboratory Press, Cold Spring Harbor, N.Y., 1989), and other laboratory manuals.

For stable transfection of mammalian cells, it is known that, depending upon the expression vector and transfection technique used, only a small fraction of cells may integrate the foreign DNA into their genome. In order to identify and select these integrants, a gene that

encodes a selectable marker (*e.g.*, resistance to antibiotics) is generally introduced into the host cells along with the gene of interest. Various selectable markers include those that confer resistance to drugs, such as G418, hygromycin and methotrexate. Nucleic acid encoding a selectable marker can be introduced into a host cell on the same vector as that encoding ORX or can be introduced on a separate vector. Cells stably transfected with the introduced nucleic acid can be identified by drug selection (*e.g.*, cells that have incorporated the selectable marker gene will survive, while the other cells die).

A host cell of the invention, such as a prokaryotic or eukaryotic host cell in culture, can be used to produce (*i.e.*, express) ORX protein. Accordingly, the invention further provides methods for producing ORX protein using the host cells of the invention. In one embodiment, the method comprises culturing the host cell of invention (into which a recombinant expression vector encoding ORX protein has been introduced) in a suitable medium such that ORX protein is produced. In another embodiment, the method further comprises isolating ORX protein from the medium or the host cell.

Transgenic ORX Animals

The host cells of the invention can also be used to produce non-human transgenic animals. For example, in one embodiment, a host cell of the invention is a fertilized oocyte or an embryonic stem cell into which ORX protein-coding sequences have been introduced. Such host cells can then be used to create non-human transgenic animals in which exogenous ORX sequences have been introduced into their genome or homologous recombinant animals in which endogenous ORX sequences have been altered. Such animals are useful for studying the function and/or activity of ORX protein and for identifying and/or evaluating modulators of ORX protein activity. As used herein, a "transgenic animal" is a non-human animal, preferably a mammal, more preferably a rodent such as a rat or mouse, in which one or more of the cells of the animal includes a transgene. Other examples of transgenic animals include non-human primates, sheep, dogs, cows, goats, chickens, amphibians, etc. A transgene is exogenous DNA that is integrated into the genome of a cell from which a transgenic animal develops and that remains in the genome of the mature animal, thereby directing the expression of an encoded gene product in one or more cell types or tissues of the transgenic animal. As used herein, a "homologous recombinant animal" is a non-human animal, preferably a mammal, more

preferably a mouse, in which an endogenous ORX gene has been altered by homologous recombination between the endogenous gene and an exogenous DNA molecule introduced into a cell of the animal, *e.g.*, an embryonic cell of the animal, prior to development of the animal.

A transgenic animal of the invention can be created by introducing ORX-encoding nucleic acid into the male pronuclei of a fertilized oocyte (*e.g.*, by microinjection, retroviral infection) and allowing the oocyte to develop in a pseudopregnant female foster animal. Sequences including GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843 can be introduced as a transgene into the genome of a non-human animal. Alternatively, a non-human homologue of the human ORX gene, such as a mouse ORX gene, can be isolated based on hybridization to the human ORX cDNA (described further *supra*) and used as a transgene. Intronic sequences and polyadenylation signals can also be included in the transgene to increase the efficiency of expression of the transgene. A tissue-specific regulatory sequence(s) can be operably-linked to the ORX transgene to direct expression of ORX protein to particular cells. Methods for generating transgenic animals via embryo manipulation and microinjection, particularly animals such as mice, have become conventional in the art and are described, for example, in U.S. Patent Nos. 4,736,866; 4,870,009; and 4,873,191; and Hogan, 1986. In: MANIPULATING THE MOUSE EMBRYO, Cold Spring Harbor Laboratory Press, Cold Spring Harbor, N.Y. Similar methods are used for production of other transgenic animals. A transgenic founder animal can be identified based upon the presence of the ORX transgene in its genome and/or expression of ORX mRNA in tissues or cells of the animals. A transgenic founder animal can then be used to breed additional animals carrying the transgene. Moreover, transgenic animals carrying a transgene-encoding ORX protein can further be bred to other transgenic animals carrying other transgenes.

To create a homologous recombinant animal, a vector is prepared which contains at least a portion of an ORX gene into which a deletion, addition or substitution has been introduced to thereby alter, *e.g.*, functionally disrupt, the ORX gene. The ORX gene can be a human gene, but more preferably, is a non-human homologue of a human ORX gene. For example, a mouse homologue of human ORX gene of GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843, can be used to construct a homologous recombination vector suitable for altering an endogenous ORX gene in the mouse genome. In one embodiment, the vector is designed such that, upon homologous recombination, the

endogenous ORX gene is functionally disrupted (*i.e.*, no longer encodes a functional protein; also referred to as a "knock out" vector).

Alternatively, the vector can be designed such that, upon homologous recombination, the endogenous ORX gene is mutated or otherwise altered but still encodes functional protein (*e.g.*, the upstream regulatory region can be altered to thereby alter the expression of the endogenous ORX protein). In the homologous recombination vector, the altered portion of the ORX gene is flanked at its 5'- and 3'-termini by additional nucleic acid of the ORX gene to allow for homologous recombination to occur between the exogenous ORX gene carried by the vector and an endogenous ORX gene in an embryonic stem cell. The additional flanking ORX nucleic acid is of sufficient length for successful homologous recombination with the endogenous gene. Typically, several kilobases of flanking DNA (both at the 5'- and 3'-termini) are included in the vector. *See, e.g.,* Thomas, *et al.*, 1987. *Cell* 51: 503 for a description of homologous recombination vectors. The vector is ten introduced into an embryonic stem cell line (*e.g.*, by electroporation) and cells in which the introduced ORX gene has homologously-recombined with the endogenous ORX gene are selected. *See, e.g.*, Li, *et al.*, 1992. *Cell* 69: 915.

The selected cells are then injected into a blastocyst of an animal (*e.g.*, a mouse) to form aggregation chimeras. *See, e.g.*, Bradley, 1987. In: TERATOCARCINOMAS AND EMBRYONIC STEM CELLS: A PRACTICAL APPROACH, Robertson, ed. IRL, Oxford, pp. 113-152. A chimeric embryo can then be implanted into a suitable pseudopregnant female foster animal and the embryo brought to term. Progeny harboring the homologously-recombined DNA in their germ cells can be used to breed animals in which all cells of the animal contain the homologously-recombined DNA by germline transmission of the transgene. Methods for constructing homologous recombination vectors and homologous recombinant animals are described further in Bradley, 1991. *Curr. Opin. Biotechnol.* 2: 823-829; PCT International Publication Nos.: WO 90/11354; WO 91/01140; WO 92/0968; and WO 93/04169.

In another embodiment, transgenic non-humans animals can be produced that contain selected systems that allow for regulated expression of the transgene. One example of such a system is the cre/loxP recombinase system of bacteriophage P1. For a description of the cre/loxP recombinase system, *See, e.g.*, Lakso, *et al.*, 1992. *Proc. Natl. Acad. Sci. USA* 89: 6232-6236. Another example of a recombinase system is the FLP recombinase system of *Saccharomyces cerevisiae. See,* O'Gorman, *et al.*, 1991. *Science* 251:1351-1355. If a cre/loxP recombinase

system is used to regulate expression of the transgene, animals containing transgenes encoding both the Cre recombinase and a selected protein are required. Such animals can be provided through the construction of "double" transgenic animals, *e.g.*, by mating two transgenic animals, one containing a transgene encoding a selected protein and the other containing a transgene encoding a recombinase.

Clones of the non-human transgenic animals described herein can also be produced according to the methods described in Wilmut, *et al.*, 1997. *Nature* 385: 810-813. In brief, a cell (*e.g.*, a somatic cell) from the transgenic animal can be isolated and induced to exit the growth cycle and enter G_0 phase. The quiescent cell can then be fused, *e.g.*, through the use of electrical pulses, to an enucleated oocyte from an animal of the same species from which the quiescent cell is isolated. The reconstructed oocyte is then cultured such that it develops to morula or blastocyte and then transferred to pseudopregnant female foster animal. The offspring borne of this female foster animal will be a clone of the animal from which the cell (*e.g.*, the somatic cell) is isolated.

Pharmaceutical Compositions

The ORX nucleic acid molecules, ORX proteins, and anti-ORX antibodies (also referred to herein as "active compounds") of the invention, and derivatives, fragments, analogs and homologs thereof, can be incorporated into pharmaceutical compositions suitable for administration. Such compositions typically comprise the nucleic acid molecule, protein, or antibody and a pharmaceutically acceptable carrier. As used herein, "pharmaceutically acceptable carrier" is intended to include any and all solvents, dispersion media, coatings, antibacterial and antifungal agents, isotonic and absorption delaying agents, and the like, compatible with pharmaceutical administration. Suitable carriers are described in the most recent edition of Remington's Pharmaceutical Sciences, a standard reference text in the field, which is incorporated herein by reference. Preferred examples of such carriers or diluents include, but are not limited to, water, saline, finger's solutions, dextrose solution, and 5% human serum albumin. Liposomes and non-aqueous vehicles such as fixed oils may also be used. The use of such media and agents for pharmaceutically active substances is well known in the art. Except insofar as any conventional media or agent is incompatible with the active compound, use

thereof in the compositions is contemplated. Supplementary active compounds can also be incorporated into the compositions.

The antibodies disclosed herein can also be formulated as immunoliposomes. Liposomes containing the antibody are prepared by methods known in the art, such as described in Epstein et al., Proc. Natl. Acad. Sci. USA, 82: 3688 (1985); Hwang et al., Proc. Natl Acad. Sci. USA, 77: 4030 (1980); and U.S. Pat. Nos. 4,485,045 and 4,544,545. Liposomes with enhanced circulation time are disclosed in U.S. Patent No. 5,013,556.

Particularly useful liposomes can be generated by the reverse-phase evaporation method with a lipid composition comprising phosphatidylcholine, cholesterol, and PEG-derivatized phosphatidylethanolamine (PEG-PE). Liposomes are extruded through filters of defined pore size to yield liposomes with the desired diameter. Fab' fragments of the antibody of the present invention can be conjugated to the liposomes as described in Martin et al ., J. Biol. Chem., 257: 286-288 (1982) via a disulfide-interchange reaction. A chemotherapeutic agent (such as Doxorubicin) is optionally contained within the liposome. See Gabizon et al., J. National Cancer Inst., 81(19): 1484 (1989).

A pharmaceutical composition of the invention is formulated to be compatible with its intended route of administration. Examples of routes of administration include parenteral, *e.g.*, intravenous, intradermal, subcutaneous, oral (*e.g.*, inhalation), transdermal (*i.e.,* topical), transmucosal, and rectal administration. Solutions or suspensions used for parenteral, intradermal, or subcutaneous application can include the following components: a sterile diluent such as water for injection, saline solution, fixed oils, polyethylene glycols, glycerine, propylene glycol or other synthetic solvents; antibacterial agents such as benzyl alcohol or methyl parabens; antioxidants such as ascorbic acid or sodium bisulfite; chelating agents such as ethylenediaminetetraacetic acid (EDTA); buffers such as acetates, citrates or phosphates, and agents for the adjustment of tonicity such as sodium chloride or dextrose. The pH can be adjusted with acids or bases, such as hydrochloric acid or sodium hydroxide. The parenteral preparation can be enclosed in ampoules, disposable syringes or multiple dose vials made of glass or plastic.

Pharmaceutical compositions suitable for injectable use include sterile aqueous solutions (where water soluble) or dispersions and sterile powders for the extemporaneous preparation of sterile injectable solutions or dispersion. For intravenous administration, suitable carriers include

physiological saline, bacteriostatic water, Cremophor EL™ (BASF, Parsippany, N.J.) or phosphate buffered saline (PBS). In all cases, the composition must be sterile and should be fluid to the extent that easy syringeability exists. It must be stable under the conditions of manufacture and storage and must be preserved against the contaminating action of microorganisms such as bacteria and fungi. The carrier can be a solvent or dispersion medium containing, for example, water, ethanol, polyol (for example, glycerol, propylene glycol, and liquid polyethylene glycol, and the like), and suitable mixtures thereof. The proper fluidity can be maintained, for example, by the use of a coating such as lecithin, by the maintenance of the required particle size in the case of dispersion and by the use of surfactants. Prevention of the action of microorganisms can be achieved by various antibacterial and antifungal agents, for example, parabens, chlorobutanol, phenol, ascorbic acid, thimerosal, and the like. In many cases, it will be preferable to include isotonic agents, for example, sugars, polyalcohols such as manitol, sorbitol, sodium chloride in the composition. Prolonged absorption of the injectable compositions can be brought about by including in the composition an agent which delays absorption, for example, aluminum monostearate and gelatin.

Sterile injectable solutions can be prepared by incorporating the active compound (*e.g.*, an ORX protein or anti-ORX antibody) in the required amount in an appropriate solvent with one or a combination of ingredients enumerated above, as required, followed by filtered sterilization. Generally, dispersions are prepared by incorporating the active compound into a sterile vehicle that contains a basic dispersion medium and the required other ingredients from those enumerated above. In the case of sterile powders for the preparation of sterile injectable solutions, methods of preparation are vacuum drying and freeze-drying that yields a powder of the active ingredient plus any additional desired ingredient from a previously sterile-filtered solution thereof.

Oral compositions generally include an inert diluent or an edible carrier. They can be enclosed in gelatin capsules or compressed into tablets. For the purpose of oral therapeutic administration, the active compound can be incorporated with excipients and used in the form of tablets, troches, or capsules. Oral compositions can also be prepared using a fluid carrier for use as a mouthwash, wherein the compound in the fluid carrier is applied orally and swished and expectorated or swallowed. Pharmaceutically compatible binding agents, and/or adjuvant materials can be included as part of the composition. The tablets, pills, capsules, troches and the

like can contain any of the following ingredients, or compounds of a similar nature: a binder such as microcrystalline cellulose, gum tragacanth or gelatin; an excipient such as starch or lactose, a disintegrating agent such as alginic acid, Primogel, or corn starch; a lubricant such as magnesium stearate or Sterotes; a glidant such as colloidal silicon dioxide; a sweetening agent such as sucrose or saccharin; or a flavoring agent such as peppermint, methyl salicylate, or orange flavoring.

For administration by inhalation, the compounds are delivered in the form of an aerosol spray from pressured container or dispenser which contains a suitable propellant, *e.g.*, a gas such as carbon dioxide, or a nebulizer.

Systemic administration can also be by transmucosal or transdermal means. For transmucosal or transdermal administration, penetrants appropriate to the barrier to be permeated are used in the formulation. Such penetrants are generally known in the art, and include, for example, for transmucosal administration, detergents, bile salts, and fusidic acid derivatives. Transmucosal administration can be accomplished through the use of nasal sprays or suppositories. For transdermal administration, the active compounds are formulated into ointments, salves, gels, or creams as generally known in the art.

The compounds can also be prepared in the form of suppositories (*e.g.*, with conventional suppository bases such as cocoa butter and other glycerides) or retention enemas for rectal delivery.

In one embodiment, the active compounds are prepared with carriers that will protect the compound against rapid elimination from the body, such as a controlled release formulation, including implants and microencapsulated delivery systems. Biodegradable, biocompatible polymers can be used, such as ethylene vinyl acetate, polyanhydrides, polyglycolic acid, collagen, polyorthoesters, and polylactic acid. Methods for preparation of such formulations will be apparent to those skilled in the art. The materials can also be obtained commercially from Alza Corporation and Nova Pharmaceuticals, Inc. Liposomal suspensions (including liposomes targeted to infected cells with monoclonal antibodies to viral antigens) can also be used as pharmaceutically acceptable carriers. These can be prepared according to methods known to those skilled in the art, for example, as described in U.S. Patent No. 4,522,811.

It is especially advantageous to formulate oral or parenteral compositions in dosage unit form for ease of administration and uniformity of dosage. Dosage unit form as used herein refers

to physically discrete units suited as unitary dosages for the subject to be treated; each unit containing a predetermined quantity of active compound calculated to produce the desired therapeutic effect in association with the required pharmaceutical carrier. The specification for the dosage unit forms of the invention are dictated by and directly dependent on the unique characteristics of the active compound and the particular therapeutic effect to be achieved, and the limitations inherent in the art of compounding such an active compound for the treatment of individuals.

The nucleic acid molecules of the invention can be inserted into vectors and used as gene therapy vectors. Gene therapy vectors can be delivered to a subject by, for example, intravenous injection, local administration (*see, e.g.,* U.S. Patent No. 5,328,470) or by stereotactic injection (*see, e.g.*, Chen, *et al.*, 1994. *Proc. Natl. Acad. Sci. USA* 91: 3054-3057). The pharmaceutical preparation of the gene therapy vector can include the gene therapy vector in an acceptable diluent, or can comprise a slow release matrix in which the gene delivery vehicle is imbedded. Alternatively, where the complete gene delivery vector can be produced intact from recombinant cells, *e.g.*, retroviral vectors, the pharmaceutical preparation can include one or more cells that produce the gene delivery system.

Antibodies specifically binding a protein of the invention, as well as other molecules identified by the screening assays disclosed herein, can be administered for the treatment of various disorders in the form of pharmaceutical compositions. Principles and considerations involved in preparing such compositions, as well as guidance in the choice of components are provided, for example, in Remington : The Science And Practice Of Pharmacy 19th ed. (Alfonso R. Gennaro, et al., editors) Mack Pub. Co., Easton, Pa.: 1995; Drug Absorption Enhancement : Concepts, Possibilities, Limitations, And Trends, Harwood Academic Publishers, Langhorne, Pa., 1994; and Peptide And Protein Drug Delivery (Advances In Parenteral Sciences, Vol. 4), 1991, M. Dekker, New York. If the antigenic protein is intracellular and whole antibodies are used as inhibitors, internalizing antibodies are preferred. However, liposomes can also be used to deliver the antibody, or an antibody fragment, into cells. Where antibody fragments are used, the smallest inhibitory fragment that specifically binds to the binding domain of the target protein is preferred. For example, based upon the variable-region sequences of an antibody, peptide molecules can be designed that retain the ability to bind the target protein sequence. Such peptides can be synthesized chemically and/or produced by recombinant DNA technology. See,

e.g., Marasco *et al.*, 1993 *Proc. Natl. Acad. Sci. USA*, 90: 7889-7893. The formulation herein can also contain more than one active compound as necessary for the particular indication being treated, preferably those with complementary activities that do not adversely affect each other. Alternatively, or in addition, the composition can comprise an agent that enhances its function, such as, for example, a cytotoxic agent, cytokine, chemotherapeutic agent, or growth-inhibitory agent. Such molecules are suitably present in combination in amounts that are effective for the purpose intended. The active ingredients can also be entrapped in microcapsules prepared, for example, by coacervation techniques or by interfacial polymerization, for example, hydroxymethylcellulose or gelatin-microcapsules and poly-(methylmethacrylate) microcapsules, respectively, in colloidal drug delivery systems (for example, liposomes, albumin microspheres, microemulsions, nano-particles, and nanocapsules) or in macroemulsions.

The formulations to be used for *in vivo* administration must be sterile. This is readily accomplished by filtration through sterile filtration membranes.

Sustained-release preparations can be prepared. Suitable examples of sustained-release preparations include semipermeable matrices of solid hydrophobic polymers containing the antibody, which matrices are in the form of shaped articles, *e.g.*, films, or microcapsules. Examples of sustained-release matrices include polyesters, hydrogels (for example, poly(2-hydroxyethyl-methacrylate), or poly(vinylalcohol)), polylactides (U.S. Pat. No. 3,773,919), copolymers of L-glutamic acid and ? ethyl-L-glutamate, non-degradable ethylene-vinyl acetate, degradable lactic acid-glycolic acid copolymers such as the LUPRON DEPOT ™ (injectable microspheres composed of lactic acid-glycolic acid copolymer and leuprolide acetate), and poly-D-(-)-3-hydroxybutyric acid. While polymers such as ethylene-vinyl acetate and lactic acid-glycolic acid enable release of molecules for over 100 days, certain hydrogels release proteins for shorter time periods.

The pharmaceutical compositions can be included in a container, pack, or dispenser together with instructions for administration.

Screening and Detection Methods

The isolated nucleic acid molecules of the invention can be used to express ORX protein (*e.g.*, via a recombinant expression vector in a host cell in gene therapy applications), to detect ORX mRNA (*e.g.*, in a biological sample) or a genetic lesion in an ORX gene, and to modulate

ORX activity, as described further, below. In addition, the ORX proteins can be used to screen drugs or compounds that modulate the ORX protein activity or expression as well as to treat disorders characterized by insufficient or excessive production of ORX protein or production of ORX protein forms that have decreased or aberrant activity compared to ORX wild-type protein . In addition, the anti-ORX antibodies of the invention can be used to detect and isolate ORX proteins and modulate ORX activity. For example, ORX activity includes growth and differentiation, antibody production, and tumor growth.

The invention further pertains to novel agents identified by the screening assays described herein and uses thereof for treatments as described, *supra*.

Screening Assays

The invention provides a method (also referred to herein as a "screening assay") for identifying modulators, *i.e.*, candidate or test compounds or agents (*e.g.*, peptides, peptidomimetics, small molecules or other drugs) that bind to ORX proteins or have a stimulatory or inhibitory effect on, *e.g.*, ORX protein expression or ORX protein activity. The invention also includes compounds identified in the screening assays described herein.

In one embodiment, the invention provides assays for screening candidate or test compounds which bind to or modulate the activity of the membrane-bound form of an ORX protein or polypeptide or biologically-active portion thereof. The test compounds of the invention can be obtained using any of the numerous approaches in combinatorial library methods known in the art, including: biological libraries; spatially addressable parallel solid phase or solution phase libraries; synthetic library methods requiring deconvolution; the "one-bead one-compound" library method; and synthetic library methods using affinity chromatography selection. The biological library approach is limited to peptide libraries, while the other four approaches are applicable to peptide, non-peptide oligomer or small molecule libraries of compounds. *See, e.g.,* Lam, 1997. *Anticancer Drug Design* 12: 145.

A "small molecule" as used herein, is meant to refer to a composition that has a molecular weight of less than about 5 kD and most preferably less than about 4 kD. Small molecules can be, *e.g.*, nucleic acids, peptides, polypeptides, peptidomimetics, carbohydrates, lipids or other organic or inorganic molecules. Libraries of chemical and/or biological mixtures, such as fungal, bacterial, or algal extracts, are known in the art and can be screened with any of the assays of the invention.

Examples of methods for the synthesis of molecular libraries can be found in the art, for example in: DeWitt, *et al.*, 1993. *Proc. Natl. Acad. Sci. U.S.A.* 90: 6909; Erb, *et al.*, 1994. *Proc. Natl. Acad. Sci. U.S.A.* 91: 11422; Zuckermann, *et al.*, 1994. *J. Med. Chem.* 37: 2678; Cho, *et al.*, 1993. *Science* 261: 1303; Carrell, *et al.*, 1994. *Angew. Chem. Int. Ed. Engl.* 33: 2059; Carell, *et al.*, 1994. *Angew. Chem. Int. Ed. Engl.* 33: 2061; and Gallop, *et al.*, 1994. *J. Med. Chem.* 37: 1233.

Libraries of compounds may be presented in solution (*e.g.*, Houghten, 1992. *Biotechniques* 13: 412-421), or on beads (Lam, 1991. *Nature* 354: 82-84), on chips (Fodor, 1993. *Nature* 364: 555-556), bacteria (Ladner, U.S. Patent No. 5,223,409), spores (Ladner, U.S. Patent 5,233,409), plasmids (Cull, *et al.*, 1992. *Proc. Natl. Acad. Sci. USA* 89: 1865-1869) or on phage (Scott and Smith, 1990. *Science* 249: 386-390; Devlin, 1990. *Science* 249: 404-406; Cwirla, *et al.*, 1990. *Proc. Natl. Acad. Sci. U.S.A.* 87: 6378-6382; Felici, 1991. *J. Mol. Biol.* 222: 301-310; Ladner, U.S. Patent No. 5,233,409.).

In one embodiment, an assay is a cell-based assay in which a cell which expresses a membrane-bound form of ORX protein, or a biologically-active portion thereof, on the cell surface is contacted with a test compound and the ability of the test compound to bind to an ORX protein determined. The cell, for example, can be of mammalian origin or a yeast cell. Determining the ability of the test compound to bind to the ORX protein can be accomplished, for example, by coupling the test compound with a radioisotope or enzymatic label such that binding of the test compound to the ORX protein or biologically-active portion thereof can be determined by detecting the labeled compound in a complex. For example, test compounds can be labeled with ^{125}I, ^{35}S, ^{14}C, or ^{3}H, either directly or indirectly, and the radioisotope detected by direct counting of radioemission or by scintillation counting. Alternatively, test compounds can be enzymatically-labeled with, for example, horseradish peroxidase, alkaline phosphatase, or luciferase, and the enzymatic label detected by determination of conversion of an appropriate substrate to product. In one embodiment, the assay comprises contacting a cell which expresses a membrane-bound form of ORX protein, or a biologically-active portion thereof, on the cell surface with a known compound which binds ORX to form an assay mixture, contacting the assay mixture with a test compound, and determining the ability of the test compound to interact with an ORX protein, wherein determining the ability of the test compound to interact with an

ORX protein comprises determining the ability of the test compound to preferentially bind to ORX protein or a biologically-active portion thereof as compared to the known compound.

In another embodiment, an assay is a cell-based assay comprising contacting a cell expressing a membrane-bound form of ORX protein, or a biologically-active portion thereof, on the cell surface with a test compound and determining the ability of the test compound to modulate (*e.g.*, stimulate or inhibit) the activity of the ORX protein or biologically-active portion thereof. Determining the ability of the test compound to modulate the activity of ORX or a biologically-active portion thereof can be accomplished, for example, by determining the ability of the ORX protein to bind to or interact with an ORX target molecule. As used herein, a "target molecule" is a molecule with which an ORX protein binds or interacts in nature, for example, a molecule on the surface of a cell which expresses an ORX interacting protein, a molecule on the surface of a second cell, a molecule in the extracellular milieu, a molecule associated with the internal surface of a cell membrane or a cytoplasmic molecule. An ORX target molecule can be a non-ORX molecule or an ORX protein or polypeptide of the invention In one embodiment, an ORX target molecule is a component of a signal transduction pathway that facilitates transduction of an extracellular signal (*e.g.* a signal generated by binding of a compound to a membrane-bound ORX molecule) through the cell membrane and into the cell. The target, for example, can be a second intercellular protein that has catalytic activity or a protein that facilitates the association of downstream signaling molecules with ORX.

Determining the ability of the ORX protein to bind to or interact with an ORX target molecule can be accomplished by one of the methods described above for determining direct binding. In one embodiment, determining the ability of the ORX protein to bind to or interact with an ORX target molecule can be accomplished by determining the activity of the target molecule. For example, the activity of the target molecule can be determined by detecting induction of a cellular second messenger of the target (*i.e.* intracellular Ca^{2+}, diacylglycerol, IP_3, etc.), detecting catalytic/enzymatic activity of the target an appropriate substrate, detecting the induction of a reporter gene (comprising an ORX-responsive regulatory element operatively linked to a nucleic acid encoding a detectable marker, *e.g.*, luciferase), or detecting a cellular response, for example, cell survival, cellular differentiation, or cell proliferation.

In yet another embodiment, an assay of the invention is a cell-free assay comprising contacting an ORX protein or biologically-active portion thereof with a test compound and

determining the ability of the test compound to bind to the ORX protein or biologically-active portion thereof. Binding of the test compound to the ORX protein can be determined either directly or indirectly as described above. In one such embodiment, the assay comprises contacting the ORX protein or biologically-active portion thereof with a known compound which binds ORX to form an assay mixture, contacting the assay mixture with a test compound, and determining the ability of the test compound to interact with an ORX protein, wherein determining the ability of the test compound to interact with an ORX protein comprises determining the ability of the test compound to preferentially bind to ORX or biologically-active portion thereof as compared to the known compound.

In still another embodiment, an assay is a cell-free assay comprising contacting ORX protein or biologically-active portion thereof with a test compound and determining the ability of the test compound to modulate (*e.g.* stimulate or inhibit) the activity of the ORX protein or biologically-active portion thereof. Determining the ability of the test compound to modulate the activity of ORX can be accomplished, for example, by determining the ability of the ORX protein to bind to an ORX target molecule by one of the methods described above for determining direct binding. In an alternative embodiment, determining the ability of the test compound to modulate the activity of ORX protein can be accomplished by determining the ability of the ORX protein further modulate an ORX target molecule. For example, the catalytic/enzymatic activity of the target molecule on an appropriate substrate can be determined as described above.

In yet another embodiment, the cell-free assay comprises contacting the ORX protein or biologically-active portion thereof with a known compound which binds ORX protein to form an assay mixture, contacting the assay mixture with a test compound, and determining the ability of the test compound to interact with an ORX protein, wherein determining the ability of the test compound to interact with an ORX protein comprises determining the ability of the ORX protein to preferentially bind to or modulate the activity of an ORX target molecule.

The cell-free assays of the invention are amenable to use of both the soluble form or the membrane-bound form of ORX protein. In the case of cell-free assays comprising the membrane-bound form of ORX protein, it may be desirable to utilize a solubilizing agent such that the membrane-bound form of ORX protein is maintained in solution. Examples of such solubilizing agents include non-ionic detergents such as n-octylglucoside, n-dodecylglucoside,

n-dodecylmaltoside, octanoyl-N-methylglucamide, decanoyl-N-methylglucamide, Triton® X-100, Triton® X-114, Thesit®, Isotridecypoly(ethylene glycol ether)$_n$, N-dodecyl--N,N-dimethyl-3-ammonio-1-propane sulfonate, 3-(3-cholamidopropyl) dimethylamminiol-1-propane sulfonate (CHAPS), or 3-(3-cholamidopropyl)dimethylamminiol-2-hydroxy-1-propane sulfonate (CHAPSO).

In more than one embodiment of the above assay methods of the invention, it may be desirable to immobilize either ORX protein or its target molecule to facilitate separation of complexed from uncomplexed forms of one or both of the proteins, as well as to accommodate automation of the assay. Binding of a test compound to ORX protein, or interaction of ORX protein with a target molecule in the presence and absence of a candidate compound, can be accomplished in any vessel suitable for containing the reactants. Examples of such vessels include microtiter plates, test tubes, and micro-centrifuge tubes. In one embodiment, a fusion protein can be provided that adds a domain that allows one or both of the proteins to be bound to a matrix. For example, GST-ORX fusion proteins or GST-target fusion proteins can be adsorbed onto glutathione sepharose beads (Sigma Chemical, St. Louis, MO) or glutathione derivatized microtiter plates, that are then combined with the test compound or the test compound and either the non-adsorbed target protein or ORX protein, and the mixture is incubated under conditions conducive to complex formation (*e.g.*, at physiological conditions for salt and pH). Following incubation, the beads or microtiter plate wells are washed to remove any unbound components, the matrix immobilized in the case of beads, complex determined either directly or indirectly, for example, as described, *supra*. Alternatively, the complexes can be dissociated from the matrix, and the level of ORX protein binding or activity determined using standard techniques.

Other techniques for immobilizing proteins on matrices can also be used in the screening assays of the invention. For example, either the ORX protein or its target molecule can be immobilized utilizing conjugation of biotin and streptavidin. Biotinylated ORX protein or target molecules can be prepared from biotin-NHS (N-hydroxy-succinimide) using techniques well-known within the art (*e.g.*, biotinylation kit, Pierce Chemicals, Rockford, Ill.), and immobilized in the wells of streptavidin-coated 96 well plates (Pierce Chemical). Alternatively, antibodies reactive with ORX protein or target molecules, but which do not interfere with binding of the ORX protein to its target molecule, can be derivatized to the wells of the plate, and unbound target or ORX protein trapped in the wells by antibody conjugation. Methods for detecting such

complexes, in addition to those described above for the GST-immobilized complexes, include immunodetection of complexes using antibodies reactive with the ORX protein or target molecule, as well as enzyme-linked assays that rely on detecting an enzymatic activity associated with the ORX protein or target molecule.

In another embodiment, modulators of ORX protein expression are identified in a method wherein a cell is contacted with a candidate compound and the expression of ORX mRNA or protein in the cell is determined. The level of expression of ORX mRNA or protein in the presence of the candidate compound is compared to the level of expression of ORX mRNA or protein in the absence of the candidate compound. The candidate compound can then be identified as a modulator of ORX mRNA or protein expression based upon this comparison. For example, when expression of ORX mRNA or protein is greater (*i.e.,* statistically significantly greater) in the presence of the candidate compound than in its absence, the candidate compound is identified as a stimulator of ORX mRNA or protein expression. Alternatively, when expression of ORX mRNA or protein is less (statistically significantly less) in the presence of the candidate compound than in its absence, the candidate compound is identified as an inhibitor of ORX mRNA or protein expression. The level of ORX mRNA or protein expression in the cells can be determined by methods described herein for detecting ORX mRNA or protein.

In yet another aspect of the invention, the ORX proteins can be used as "bait proteins" in a two-hybrid assay or three hybrid assay (*see, e.g.*, U.S. Patent No. 5,283,317; Zervos, *et al.*, 1993. *Cell* 72: 223-232; Madura, *et al.*, 1993. *J. Biol. Chem.* 268: 12046-12054; Bartel, *et al.*, 1993. *Biotechniques* 14: 920-924; Iwabuchi, *et al.*, 1993. *Oncogene* 8: 1693-1696; and Brent WO 94/10300), to identify other proteins that bind to or interact with ORX ("ORX-binding proteins" or "ORX-bp") and modulate ORX activity. Such ORX-binding proteins are also likely to be involved in the propagation of signals by the ORX proteins as, for example, upstream or downstream elements of the ORX pathway.

The two-hybrid system is based on the modular nature of most transcription factors, which consist of separable DNA-binding and activation domains. Briefly, the assay utilizes two different DNA constructs. In one construct, the gene that codes for ORX is fused to a gene encoding the DNA binding domain of a known transcription factor (*e.g.*, GAL-4). In the other construct, a DNA sequence, from a library of DNA sequences, that encodes an unidentified protein ("prey" or "sample") is fused to a gene that codes for the activation domain of the known

transcription factor. If the "bait" and the "prey" proteins are able to interact, *in vivo*, forming an ORX-dependent complex, the DNA-binding and activation domains of the transcription factor are brought into close proximity. This proximity allows transcription of a reporter gene (*e.g.*, LacZ) that is operably linked to a transcriptional regulatory site responsive to the transcription factor. Expression of the reporter gene can be detected and cell colonies containing the functional transcription factor can be isolated and used to obtain the cloned gene that encodes the protein which interacts with ORX.

The invention further pertains to novel agents identified by the aforementioned screening assays and uses thereof for treatments as described herein.

Detection Assays

Portions or fragments of the cDNA sequences identified herein (and the corresponding complete gene sequences) can be used in numerous ways as polynucleotide reagents. By way of example, and not of limitation, these sequences can be used to: (*i*) identify an individual from a minute biological sample (tissue typing); and (*ii*) aid in forensic identification of a biological sample. Some of these applications are described in the subsections, below.

Tissue Typing

The ORX sequences of the invention can be used to identify individuals from minute biological samples. In this technique, an individual's genomic DNA is digested with one or more restriction enzymes, and probed on a Southern blot to yield unique bands for identification. The sequences of the invention are useful as additional DNA markers for RFLP ("restriction fragment length polymorphisms," described in U.S. Patent No. 5,272,057).

Furthermore, the sequences of the invention can be used to provide an alternative technique that determines the actual base-by-base DNA sequence of selected portions of an individual's genome. Thus, the ORX sequences described herein can be used to prepare two PCR primers from the 5'- and 3'-termini of the sequences. These primers can then be used to amplify an individual's DNA and subsequently sequence it.

Panels of corresponding DNA sequences from individuals, prepared in this manner, can provide unique individual identifications, as each individual will have a unique set of such DNA sequences due to allelic differences. The sequences of the invention can be used to obtain such identification sequences from individuals and from tissue. The ORX sequences of the invention

uniquely represent portions of the human genome. Allelic variation occurs to some degree in the coding regions of these sequences, and to a greater degree in the noncoding regions. It is estimated that allelic variation between individual humans occurs with a frequency of about once per each 500 bases. Much of the allelic variation is due to single nucleotide polymorphisms (SNPs), which include restriction fragment length polymorphisms (RFLPs).

Each of the sequences described herein can, to some degree, be used as a standard against which DNA from an individual can be compared for identification purposes. Because greater numbers of polymorphisms occur in the noncoding regions, fewer sequences are necessary to differentiate individuals. The noncoding sequences can comfortably provide positive individual identification with a panel of perhaps 10 to 1,000 primers that each yield a noncoding amplified sequence of 100 bases. If predicted coding sequences are used, a more appropriate number of primers for positive individual identification would be 500-2,000.

Predictive Medicine

The invention also pertains to the field of predictive medicine in which diagnostic assays, prognostic assays, pharmacogenomics, and monitoring clinical trials are used for prognostic (predictive) purposes to thereby treat an individual prophylactically. Accordingly, one aspect of the invention relates to diagnostic assays for determining ORX protein and/or nucleic acid expression as well as ORX activity, in the context of a biological sample (*e.g.*, blood, serum, cells, tissue) to thereby determine whether an individual is afflicted with a disease or disorder, or is at risk of developing a disorder, associated with aberrant ORX expression or activity. Disorders associated with aberrant ORX expression of activity include, for example, neurodegenerative, cell proliferative, angiogenic, hematopoietic, immunological, inflammatory, and tumor-related disorders and/or pathologies.

The invention also provides for prognostic (or predictive) assays for determining whether an individual is at risk of developing a disorder associated with ORX protein, nucleic acid expression or activity. For example, mutations in an ORX gene can be assayed in a biological sample. Such assays can be used for prognostic or predictive purpose to thereby prophylactically treat an individual prior to the onset of a disorder characterized by or associated with ORX protein, nucleic acid expression, or biological activity.

Another aspect of the invention provides methods for determining ORX protein, nucleic acid expression or activity in an individual to thereby select appropriate therapeutic or prophylactic agents for that individual (referred to herein as "pharmacogenomics"). Pharmacogenomics allows for the selection of agents (*e.g.*, drugs) for therapeutic or prophylactic treatment of an individual based on the genotype of the individual (*e.g.*, the genotype of the individual examined to determine the ability of the individual to respond to a particular agent.)

Yet another aspect of the invention pertains to monitoring the influence of agents (*e.g.*, drugs, compounds) on the expression or activity of ORX in clinical trials.

These and other agents are described in further detail in the following sections.

Diagnostic Assays

An exemplary method for detecting the presence or absence of ORX in a biological sample involves obtaining a biological sample from a test subject and contacting the biological sample with a compound or an agent capable of detecting ORX protein or nucleic acid (*e.g.*, mRNA, genomic DNA) that encodes ORX protein such that the presence of ORX is detected in the biological sample. An agent for detecting ORX mRNA or genomic DNA is a labeled nucleic acid probe capable of hybridizing to ORX mRNA or genomic DNA. The nucleic acid probe can be, for example, a full-length ORX nucleic acid, or a portion thereof, such as an oligonucleotide of at least 15, 30, 50, 100, 250 or 500 nucleotides in length and sufficient to specifically hybridize under stringent conditions to ORX mRNA or genomic DNA. Other suitable probes for use in the diagnostic assays of the invention are described herein.

One agent for detecting ORX protein is an antibody capable of binding to ORX protein, preferably an antibody with a detectable label. Antibodies directed against a protein of the invention may be used in methods known within the art relating to the localization and/or quantitation of the protein (*e.g.*, for use in measuring levels of the protein within appropriate physiological samples, for use in diagnostic methods, for use in imaging the protein, and the like). In a given embodiment, antibodies against the proteins, or derivatives, fragments, analogs or homologs thereof, that contain the antigen binding domain, are utilized as pharmacologically-active compounds.

An antibody specific for a protein of the invention can be used to isolate the protein by standard techniques, such as immunoaffinity chromatography or immunoprecipitation. Such an antibody can facilitate the purification of the natural protein antigen from cells and of

recombinantly produced antigen expressed in host cells. Moreover, such an antibody can be used to detect the antigenic protein (*e.g.*, in a cellular lysate or cell supernatant) in order to evaluate the abundance and pattern of expression of the antigenic protein. Antibodies directed against the protein can be used diagnostically to monitor protein levels in tissue as part of a clinical testing procedure, *e.g.*, to, for example, determine the efficacy of a given treatment regimen. Detection can be facilitated by coupling (*i.e.*, physically linking) the antibody to a detectable substance. Examples of detectable substances include various enzymes, prosthetic groups, fluorescent materials, luminescent materials, bioluminescent materials, and radioactive materials. Examples of suitable enzymes include horseradish peroxidase, alkaline phosphatase, β-galactosidase, or acetylcholinesterase; examples of suitable prosthetic group complexes include streptavidin/biotin and avidin/biotin; examples of suitable fluorescent materials include umbelliferone, fluorescein, fluorescein isothiocyanate, rhodamine, dichlorotriazinylamine fluorescein, dansyl chloride or phycoerythrin; an example of a luminescent material includes luminol; examples of bioluminescent materials include luciferase, luciferin, and aequorin, and examples of suitable radioactive material include ^{125}I, ^{131}I, ^{35}S or ^{3}H.

Antibodies can be polyclonal, or more preferably, monoclonal. An intact antibody, or a fragment thereof (*e.g.*, Fab or $F(ab')_2$) can be used. The term "labeled", with regard to the probe or antibody, is intended to encompass direct labeling of the probe or antibody by coupling (*i.e.*, physically linking) a detectable substance to the probe or antibody, as well as indirect labeling of the probe or antibody by reactivity with another reagent that is directly labeled. Examples of indirect labeling include detection of a primary antibody using a fluorescently-labeled secondary antibody and end-labeling of a DNA probe with biotin such that it can be detected with fluorescently-labeled streptavidin. The term "biological sample" is intended to include tissues, cells and biological fluids isolated from a subject, as well as tissues, cells and fluids present within a subject. That is, the detection method of the invention can be used to detect ORX mRNA, protein, or genomic DNA in a biological sample *in vitro* as well as *in vivo*. For example, *in vitro* techniques for detection of ORX mRNA include Northern hybridizations and *in situ* hybridizations. *In vitro* techniques for detection of ORX protein include enzyme linked immunosorbent assays (ELISAs), Western blots, immunoprecipitations, and immunofluorescence. *In vitro* techniques for detection of ORX genomic DNA include Southern hybridizations. Furthermore, *in vivo* techniques for detection of ORX protein include

introducing into a subject a labeled anti-ORX antibody. For example, the antibody can be labeled with a radioactive marker whose presence and location in a subject can be detected by standard imaging techniques.

In one embodiment, the biological sample contains protein molecules from the test subject. Alternatively, the biological sample can contain mRNA molecules from the test subject or genomic DNA molecules from the test subject. A preferred biological sample is a peripheral blood leukocyte sample isolated by conventional means from a subject.

In one embodiment, the methods further involve obtaining a control biological sample from a control subject, contacting the control sample with a compound or agent capable of detecting ORX protein, mRNA, or genomic DNA, such that the presence of ORX protein, mRNA or genomic DNA is detected in the biological sample, and comparing the presence of ORX protein, mRNA or genomic DNA in the control sample with the presence of ORX protein, mRNA or genomic DNA in the test sample.

The invention also encompasses kits for detecting the presence of ORX in a biological sample. For example, the kit can comprise: a labeled compound or agent capable of detecting ORX protein or mRNA in a biological sample; means for determining the amount of ORX in the sample; and means for comparing the amount of ORX in the sample with a standard. The compound or agent can be packaged in a suitable container. The kit can further comprise instructions for using the kit to detect ORX protein or nucleic acid.

Prognostic Assays

The diagnostic methods described herein can furthermore be utilized to identify subjects having or at risk of developing a disease or disorder associated with aberrant ORX expression or activity. For example, the assays described herein, such as the preceding diagnostic assays or the following assays, can be utilized to identify a subject having or at risk of developing a disorder associated with ORX protein, nucleic acid expression or activity. Such disorders include for example, neurodegenerative, cell proliferative, angiogenic, hematopoietic, immunological, inflammatory, and tumor-related disorders and/or pathologies.

Alternatively, the prognostic assays can be utilized to identify a subject having or at risk for developing a disease or disorder. Thus, the invention provides a method for identifying a disease or disorder associated with aberrant ORX expression or activity in which a test sample is obtained from a subject and ORX protein or nucleic acid (*e.g.*, mRNA, genomic DNA) is

detected, wherein the presence of ORX protein or nucleic acid is diagnostic for a subject having or at risk of developing a disease or disorder associated with aberrant ORX expression or activity. As used herein, a "test sample" refers to a biological sample obtained from a subject of interest. For example, a test sample can be a biological fluid (*e.g.*, serum), cell sample, or tissue.

Furthermore, the prognostic assays described herein can be used to determine whether a subject can be administered an agent (*e.g.*, an agonist, antagonist, peptidomimetic, protein, peptide, nucleic acid, small molecule, or other drug candidate) to treat a disease or disorder associated with aberrant ORX expression or activity. For example, such methods can be used to determine whether a subject can be effectively treated with an agent for a disorder. Thus, the invention provides methods for determining whether a subject can be effectively treated with an agent for a disorder associated with aberrant ORX expression or activity in which a test sample is obtained and ORX protein or nucleic acid is detected (*e.g.*, wherein the presence of ORX protein or nucleic acid is diagnostic for a subject that can be administered the agent to treat a disorder associated with aberrant ORX expression or activity).

The methods of the invention can also be used to detect genetic lesions in an ORX gene, thereby determining if a subject with the lesioned gene is at risk for a disorder characterized by aberrant cell proliferation and/or differentiation. In various embodiments, the methods include detecting, in a sample of cells from the subject, the presence or absence of a genetic lesion characterized by at least one of an alteration affecting the integrity of a gene encoding an ORX-protein, or the misexpression of the ORX gene. For example, such genetic lesions can be detected by ascertaining the existence of at least one of: (*i*) a deletion of one or more nucleotides from an ORX gene; (*ii*) an addition of one or more nucleotides to an ORX gene; (*iii*) a substitution of one or more nucleotides of an ORX gene, (*iv*) a chromosomal rearrangement of an ORX gene; (*v*) an alteration in the level of a messenger RNA transcript of an ORX gene, (*vi*) aberrant modification of an ORX gene, such as of the methylation pattern of the genomic DNA, (*vii*) the presence of a non-wild-type splicing pattern of a messenger RNA transcript of an ORX gene, (*viii*) a non-wild-type level of an ORX protein, (*ix*) allelic loss of an ORX gene, and (*x*) inappropriate post-translational modification of an ORX protein. As described herein, there are a large number of assay techniques known in the art which can be used for detecting lesions in an ORX gene. A preferred biological sample is a peripheral blood leukocyte sample isolated by

conventional means from a subject. However, any biological sample containing nucleated cells may be used, including, for example, buccal mucosal cells.

In certain embodiments, detection of the lesion involves the use of a probe/primer in a polymerase chain reaction (PCR) (*see, e.g.*, U.S. Patent Nos. 4,683,195 and 4,683,202), such as anchor PCR or RACE PCR, or, alternatively, in a ligation chain reaction (LCR) (*see, e.g.*, Landegran, *et al.*, 1988. *Science* 241: 1077-1080; and Nakazawa, *et al.*, 1994. *Proc. Natl. Acad. Sci. USA* 91: 360-364), the latter of which can be particularly useful for detecting point mutations in the ORX-gene (*see,* Abravaya, *et al.*, 1995. *Nucl. Acids Res.* 23: 675-682). This method can include the steps of collecting a sample of cells from a patient, isolating nucleic acid (*e.g.*, genomic, mRNA or both) from the cells of the sample, contacting the nucleic acid sample with one or more primers that specifically hybridize to an ORX gene under conditions such that hybridization and amplification of the ORX gene (if present) occurs, and detecting the presence or absence of an amplification product, or detecting the size of the amplification product and comparing the length to a control sample. It is anticipated that PCR and/or LCR may be desirable to use as a preliminary amplification step in conjunction with any of the techniques used for detecting mutations described herein.

Alternative amplification methods include: self sustained sequence replication (*see,* Guatelli, *et al.*, 1990. *Proc. Natl. Acad. Sci. USA* 87: 1874-1878), transcriptional amplification system (*see,* Kwoh, *et al.*, 1989. *Proc. Natl. Acad. Sci. USA* 86: 1173-1177); Qβ Replicase (*see,* Lizardi, *et al*, 1988. *BioTechnology* 6: 1197), or any other nucleic acid amplification method, followed by the detection of the amplified molecules using techniques well known to those of skill in the art. These detection schemes are especially useful for the detection of nucleic acid molecules if such molecules are present in very low numbers.

In an alternative embodiment, mutations in an ORX gene from a sample cell can be identified by alterations in restriction enzyme cleavage patterns. For example, sample and control DNA is isolated, amplified (optionally), digested with one or more restriction endonucleases, and fragment length sizes are determined by gel electrophoresis and compared. Differences in fragment length sizes between sample and control DNA indicates mutations in the sample DNA. Moreover, the use of sequence specific ribozymes (*see, e.g.,* U.S. Patent No. 5,493,531) can be used to score for the presence of specific mutations by development or loss of a ribozyme cleavage site.

In other embodiments, genetic mutations in ORX can be identified by hybridizing a sample and control nucleic acids, *e.g.*, DNA or RNA, to high-density arrays containing hundreds or thousands of oligonucleotides probes. *See, e.g.,* Cronin, *et al.*, 1996. *Human Mutation* 7: 244-255; Kozal, *et al.*, 1996. *Nat. Med.* 2: 753-759. For example, genetic mutations in ORX can be identified in two dimensional arrays containing light-generated DNA probes as described in Cronin, *et al.*, *supra.* Briefly, a first hybridization array of probes can be used to scan through long stretches of DNA in a sample and control to identify base changes between the sequences by making linear arrays of sequential overlapping probes. This step allows the identification of point mutations. This is followed by a second hybridization array that allows the characterization of specific mutations by using smaller, specialized probe arrays complementary to all variants or mutations detected. Each mutation array is composed of parallel probe sets, one complementary to the wild-type gene and the other complementary to the mutant gene.

In yet another embodiment, any of a variety of sequencing reactions known in the art can be used to directly sequence the ORX gene and detect mutations by comparing the sequence of the sample ORX with the corresponding wild-type (control) sequence. Examples of sequencing reactions include those based on techniques developed by Maxim and Gilbert, 1977. *Proc. Natl. Acad. Sci. USA* 74: 560 or Sanger, 1977. *Proc. Natl. Acad. Sci. USA* 74: 5463. It is also contemplated that any of a variety of automated sequencing procedures can be utilized when performing the diagnostic assays (*see, e.g.,* Naeve, *et al.*, 1995. *Biotechniques* 19: 448), including sequencing by mass spectrometry (see, *e.g.*, PCT International Publication No. WO 94/16101; Cohen, *et al.*, 1996. *Adv. Chromatography* 36: 127-162; and Griffin, *et al.*, 1993. *Appl. Biochem. Biotechnol.* 38: 147-159).

Other methods for detecting mutations in the ORX gene include methods in which protection from cleavage agents is used to detect mismatched bases in RNA/RNA or RNA/DNA heteroduplexes. *See, e.g.,* Myers, *et al.*, 1985. *Science* 230: 1242. In general, the art technique of "mismatch cleavage" starts by providing heteroduplexes of formed by hybridizing (labeled) RNA or DNA containing the wild-type ORX sequence with potentially mutant RNA or DNA obtained from a tissue sample. The double-stranded duplexes are treated with an agent that cleaves single-stranded regions of the duplex such as which will exist due to basepair mismatches between the control and sample strands. For instance, RNA/DNA duplexes can be treated with RNase and DNA/DNA hybrids treated with S_1 nuclease to enzymatically digesting the

mismatched regions. In other embodiments, either DNA/DNA or RNA/DNA duplexes can be treated with hydroxylamine or osmium tetroxide and with piperidine in order to digest mismatched regions. After digestion of the mismatched regions, the resulting material is then separated by size on denaturing polyacrylamide gels to determine the site of mutation. *See, e.g.,* Cotton, *et al.,* 1988. *Proc. Natl. Acad. Sci. USA* 85: 4397; Saleeba, *et al.,* 1992. *Methods Enzymol.* 217: 286-295. In an embodiment, the control DNA or RNA can be labeled for detection.

In still another embodiment, the mismatch cleavage reaction employs one or more proteins that recognize mismatched base pairs in double-stranded DNA (so called "DNA mismatch repair" enzymes) in defined systems for detecting and mapping point mutations in ORX cDNAs obtained from samples of cells. For example, the mutY enzyme of *E. coli* cleaves A at G/A mismatches and the thymidine DNA glycosylase from HeLa cells cleaves T at G/T mismatches. *See, e.g.,* Hsu, *et al.*, 1994. *Carcinogenesis* 15: 1657-1662. According to an exemplary embodiment, a probe based on an ORX sequence, *e.g.*, a wild-type ORX sequence, is hybridized to a cDNA or other DNA product from a test cell(s). The duplex is treated with a DNA mismatch repair enzyme, and the cleavage products, if any, can be detected from electrophoresis protocols or the like. *See, e.g.,* U.S. Patent No. 5,459,039.

In other embodiments, alterations in electrophoretic mobility will be used to identify mutations in ORX genes. For example, single strand conformation polymorphism (SSCP) may be used to detect differences in electrophoretic mobility between mutant and wild type nucleic acids. *See, e.g.,* Orita, *et al.*, 1989. *Proc. Natl. Acad. Sci. USA*: 86: 2766; Cotton, 1993. *Mutat. Res.* 285: 125-144; Hayashi, 1992. *Genet. Anal. Tech. Appl.* 9: 73-79. Single-stranded DNA fragments of sample and control ORX nucleic acids will be denatured and allowed to renature. The secondary structure of single-stranded nucleic acids varies according to sequence, the resulting alteration in electrophoretic mobility enables the detection of even a single base change. The DNA fragments may be labeled or detected with labeled probes. The sensitivity of the assay may be enhanced by using RNA (rather than DNA), in which the secondary structure is more sensitive to a change in sequence. In one embodiment, the subject method utilizes heteroduplex analysis to separate double stranded heteroduplex molecules on the basis of changes in electrophoretic mobility. *See, e.g.,* Keen, *et al.*, 1991. *Trends Genet.* 7: 5.

In yet another embodiment, the movement of mutant or wild-type fragments in polyacrylamide gels containing a gradient of denaturant is assayed using denaturing gradient gel electrophoresis (DGGE). *See, e.g.,* Myers, *et al.,* 1985. *Nature* 313: 495. When DGGE is used as the method of analysis, DNA will be modified to insure that it does not completely denature, for example by adding a GC clamp of approximately 40 bp of high-melting GC-rich DNA by PCR. In a further embodiment, a temperature gradient is used in place of a denaturing gradient to identify differences in the mobility of control and sample DNA. *See, e.g.,* Rosenbaum and Reissner, 1987. *Biophys. Chem.* 265: 12753.

Examples of other techniques for detecting point mutations include, but are not limited to, selective oligonucleotide hybridization, selective amplification, or selective primer extension. For example, oligonucleotide primers may be prepared in which the known mutation is placed centrally and then hybridized to target DNA under conditions that permit hybridization only if a perfect match is found. *See, e.g.,* Saiki, *et al.*, 1986. *Nature* 324: 163; Saiki, *et al.*, 1989. *Proc. Natl. Acad. Sci. USA* 86: 6230. Such allele specific oligonucleotides are hybridized to PCR amplified target DNA or a number of different mutations when the oligonucleotides are attached to the hybridizing membrane and hybridized with labeled target DNA.

Alternatively, allele specific amplification technology that depends on selective PCR amplification may be used in conjunction with the instant invention. Oligonucleotides used as primers for specific amplification may carry the mutation of interest in the center of the molecule (so that amplification depends on differential hybridization; *see, e.g.,* Gibbs, *et al.*, 1989. *Nucl. Acids Res.* 17: 2437-2448) or at the extreme 3'-terminus of one primer where, under appropriate conditions, mismatch can prevent, or reduce polymerase extension (*see, e.g.,* Prossner, 1993. *Tibtech.* 11: 238). In addition it may be desirable to introduce a novel restriction site in the region of the mutation to create cleavage-based detection. *See, e.g.,* Gasparini, *et al.,* 1992. *Mol. Cell Probes* 6: 1. It is anticipated that in certain embodiments amplification may also be performed using *Taq* ligase for amplification. *See, e.g.,* Barany, 1991. *Proc. Natl. Acad. Sci. USA* 88: 189. In such cases, ligation will occur only if there is a perfect match at the 3'-terminus of the 5' sequence, making it possible to detect the presence of a known mutation at a specific site by looking for the presence or absence of amplification.

The methods described herein may be performed, for example, by utilizing pre-packaged diagnostic kits comprising at least one probe nucleic acid or antibody reagent described herein,

which may be conveniently used, *e.g.*, in clinical settings to diagnose patients exhibiting symptoms or family history of a disease or illness involving an ORX gene.

Furthermore, any cell type or tissue, preferably peripheral blood leukocytes, in which ORX is expressed may be utilized in the prognostic assays described herein. However, any biological sample containing nucleated cells may be used, including, for example, buccal mucosal cells.

The invention will be further described in the following examples, which do not limit the scope of the invention described in the claims.

EXAMPLE 1: Cloning and analysis of ORX-like sequences in primates and mouse.

The isolation of ORX-related sequences has been described in Rouquier et al., *Nature Genet.* (1998) 18, 243-50 and Rouquier et al. (1998) *Hum. Mol. Genet.* 7, 1337-1345. Briefly, 100 ng of genomic DNA from each species was subjected to PCR using consensus ORX primers OR5B-OR3B (OR5B (TM2), 5'-CCCATGTA(T/C)TT(G/C/T)TT(C/T)CTC(A/G/T)(G/C)(C/T)AA(C/T)(T/C)T(G/A)TC-3' ; PMY(F/L)FL(S/A/T/G/C)NLS ; OR3B (TM7), (SEQ ID NO: 432) 5'-AG(A/G)C(A/T)(A/G)TAIATGAAIGG(A/G)TTCAICAT-3' (SEQ ID NO:433) ; M(L/F/V/I)NPF(I/M)Y(S/C)L) (SEQ ID NO:434). *See* Ben-Arie et al., (1994) *Hum. Molec. Genet. 3, 229-35.* A second pair of consensus primers, OR3.1-OR7.1 (OR3.1 (TM3), 5'-GCIATGGCITA(C/T)GA(C/T)(A/C)GITA-3' (SEQ ID NO:435) ; AMAYD(S/R)Y (SEQ ID NO:436) ; OR7.1 (TM7), 5'-A(A/G)I(G/C)(A/T)(A/G)TA(A/G/T)AT(A/G)AAIGG(A/G)TT-3' (SEQ ID NO:437); NPFIY(S/R/T/C/W)(L/F)(SEQ ID NO:438), was also used to amplify primate ORX sequences. *See* Freitag et al. (1998) *J. Comp. Physiol.* 183, 635-50 and Freitag et al., (1999) *Gene* 226, 165-74.

PCR products were subcloned in the TA vector (InVitrogen), and recombinant clones were identified by PCR. Sequencing of the ORX sequences was performed and sequences were assembled and analyzed. The following species were studied: human (Homo sapiens, HSA), chimpanzee (Pan troglodytes, PTR), gorilla (Gorilla gorilla, GGO), orangutan (Pongo pygmaeus, PPY), gibbon (Hylobates lar, HLA), macaque (Macaca sylvanus, MSY), baboon (Papio papio,

PPA), marmoset (Callithrix jacchus, CJA), squirrel-monkey (Saimiri sciureus, SSC, and Saimiri boliviensis, SBO), lemur (Eulemur fulvus, EFU, and Eulemur rubriventer, ERU), and mouse (Mus musculus domesticus, MMU). In addition, a few zebrafish (Danio rerio, DRE) sequences were also characterized using primers OR3.1-OR7.1.

Pairwise sequence comparisons and multiple alignments were performed using Gap and PileUp from the GCG package (Wisconsin Package version 8).

EXAMPLE 2: Construction and screening of an ORX-specific mouse sublibrary.

Mouse ORX clones obtained by PCR as described above were gridded in 96-well microtiter dishes (1536 clones in 8 plates). For hybridization screening, the clones were robot-spotted in duplicate on high-density filters as described in Rouquier et al. (1999) *Mamm. Genome* 10, 1172-75.. Approximately 90% of the clones were identified as ORX genes. This library was screened to identify clones hybridizing to human ORX pseudogene sequences. Human plasmid DNA probes were radiolabeled to a specific activity of 108-109 cpm/μg by random hexamer priming using (□-32P)-dCTP (Amersham) as described in Feinberg et al. (1983) *Anal. Biochem.* 132, 6-13. Filter hybridizations were carried out under standard hybridization conditions, and exposed to Kodak X-ray film at -80°C. *See* Rouquier et al., (1993) *Genomics* 17, 330-40.

Three human ORX probes were used: OR1-72, OR912-47, OR15-71 (DDBJ/GenBank accession numbers U86218, U86230, U86296 respectively).

EXAMPLE 3: Sequence analysis of mouse ORX sequences.

To test whether mammals thought to be microsmatic or macrosmatic differ in the fraction of pseudogenes in their ORX repertoire, the ORX sequences in the mouse genome were surveyed. A mouse sublibrary enriched for ORX-related sequences amplified by PCR from the mouse genome was constructed, and nineteen randomly selected mouse ORX clones were sequenced. All 19 have an uninterrupted open-reading frame (ORF) and are potentially functional. These sequences group primarily in family 1 and vary from ~52 to >99% NSI. In addition, in an attempt to bias in favor of selecting mouse ORX pseudogenes, a search for mouse ORX sequences homologous to human pseudogenes was performed. One member was chosen from three different ORX pseudogene families: clones 1-72, 15-71 and 912-47 from chromosomes 1, 15 and 11, respectively. *See* Rouquier et al., (1998) *Nature Genet.* 18, 243-50. Each of these genes belongs to one of the 3 main groups of human ORX sequences and has accumulated a number of mutations such as stop codons and indel frameshifts. *See id.* The amino-acid sequence identity between these three ranges from 31% to 41%.

High density filters from the mouse ORX sublibrary were then hybridized separately with the three human pseudogene probes at a high stringency. Fourteen clones were sequenced on both strands. These sequences showed 38% to 53% ASI to the human sequences used to select them, indicating that they are not the orthologs of the human pseudogenes. All have an uninterrupted ORF from TM2 to TM7. Together, 33 mouse ORX sequences were sequenced, none of which contained characteristic features of pseudogenes.

OTHER EMBODIMENTS

While the invention has been described in conjunction with the detailed description thereof, the foregoing description is intended to illustrate and not limit the scope of the invention, which is defined by the scope of the appended claims. Other aspects, advantages, and modifications are within the scope of the following claims.